



Forensic Science

Distance Learning Presentation
For
King Drew Magnet High School of Medicine and Science
March 14, 2007

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Agenda

Presentation in 3 parts

1. Overview of Forensic Science and how it is being taught in the high school
2. Forensic Anthropology
3. Forensic Odontology

Outcomes

Part 1

- Participants will:
 - Define forensic science and the role of the forensic scientist
 - Name various services provided by crime labs.
 - Review an overview of the syllabus for a forensic science class in Montgomery County
 - Observe student artifacts

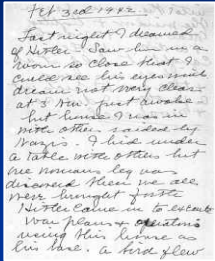
Forensic Science - is the
application of various sciences to
those criminal and civil laws that
are enforced by police agencies
in a criminal justice system

Role of the Forensic Scientist

- Analyze physical evidence and to provide expert witness testimony
- Know the laws that decide admissibility of scientific evidence
- Cannot give 100% correct answer, only an opinion based on reasonable scientific certainty based on training and experience

Early Forensic Scientists

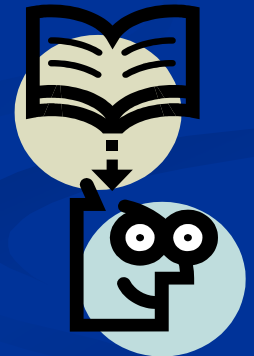
Albert S. Osborn



- Developed fundamental principles of document examination
- Responsible for acceptance of documents as scientific evidence

Hans Gross

- First work to describe application of scientific disciplines to criminal investigation



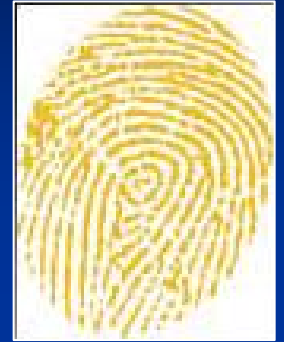
Edmund Locard

- Locard's Exchange Principle: trace evidence is transferred when people come in contact

Early Forensic Scientists

Francis Galton

- Formed the basis of today's fingerprint identification



Leone Lattes

- Recognized that blood can be grouped and devised procedure for determining blood type

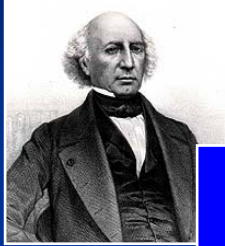


Calvin Goddard

- Established the comparison microscope as the tool for firearms comparison



Early Forensic Scientists

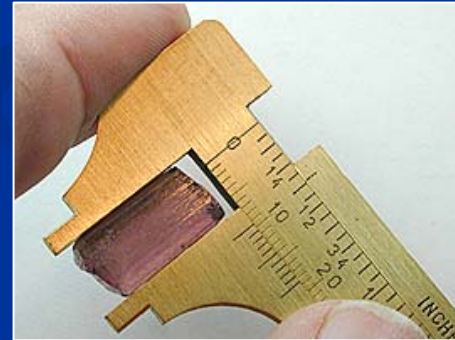


Mathieu Orfila

- First paper on detection of poisons
- Father of toxicology

Alphonse Bertillon

- First system of personal identification
- Established *anthropometry*
- Father of criminal identification



U.S. Crime Labs

- More than 300 public crime labs in the U.S.
 - Why are there so many?
 - Supreme Court decisions in 1960's placed greater emphasis on *scientifically evaluated evidence*
 - ?
 - ?
 - In 1923 the oldest crime lab was established – do you know where?

Some of the Provided Crime Laboratory Services

- Audio, Video, & Image Analysis

- Chemistry



- Combined DNA Index System

- Computer Analysis and Response



Services continued...



- DNA Analysis
- Evidence Response
- Explosives
- Firearms & Toolmarks

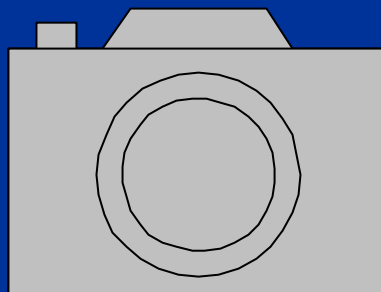


Services continued...

- Hazardous Materials Response

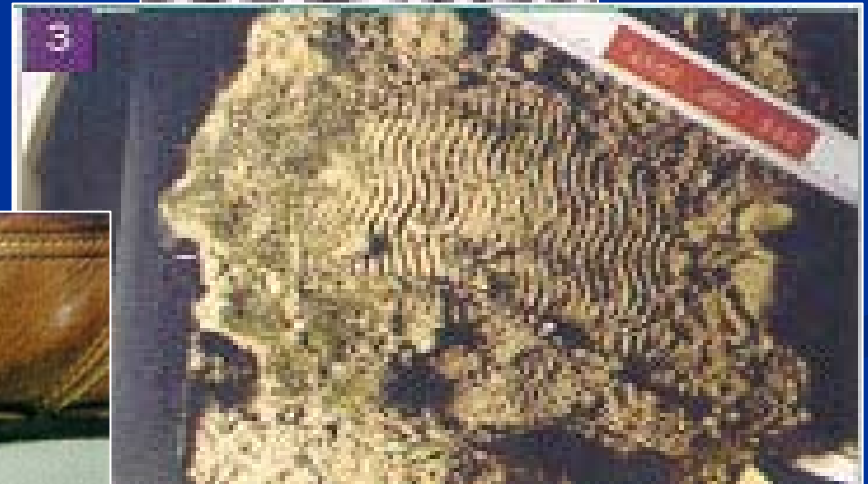
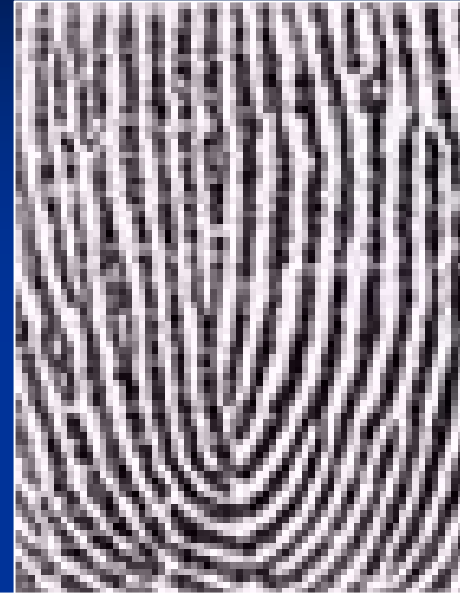
- Investigative and Prosecutive Graphics

- Photography



Services continued...

- Research
- Ridge Pattern experts / Latent prints
- Impressions



Services continued...

■ Questioned documents

Feb 3rd 1942

Last night I dreamed of Hitler - Saw him in a room so close that I could see his eyes with dream not very clear at 3 AM. just awake - but when I was in with other soldiers by Nazis - I hid under a table with others but the woman's leg was discovered then we all were brought forth Hitler came in to explain war plans & operations using this house as his base. a bird flew

■ Dan Rather



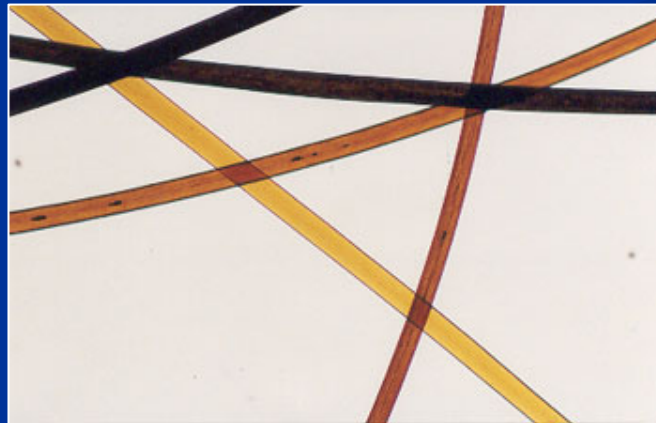
Services Continued.

- **Structural Design**



Scale models of Unabomber's cabin used during trial

- **Trace Evidence**



Overlap is common



**Bloody shoeprints left
on brick floor**



human head
hair

fiber
glass

animal
hair

nylon carpet
fiber

**So what is forensic science
class all about?**

Goal/purpose

- In Forensic Science, students apply cross-disciplinary scientific knowledge and techniques to investigate crime scenes, evaluate various types of evidence, solve scenario-based “crimes,” while exploring career opportunities.

Content

- Society's trend has made the scientist, an active participant in the crime laboratory, a useful part of the criminal justice system.
- Students are exposed to analysis involving human remains, glass and soils, trace evidence, firearms and tool marks, documents, and entomological specimens. Cutting-edge biotechnological techniques are also explored.
- Writing and verbal communication skills are essential tools with which students both analyze and present their findings.

4 Main Categories

- Forensic Science and the Law
- Biological Science
- Chemical Science
- Physical Science

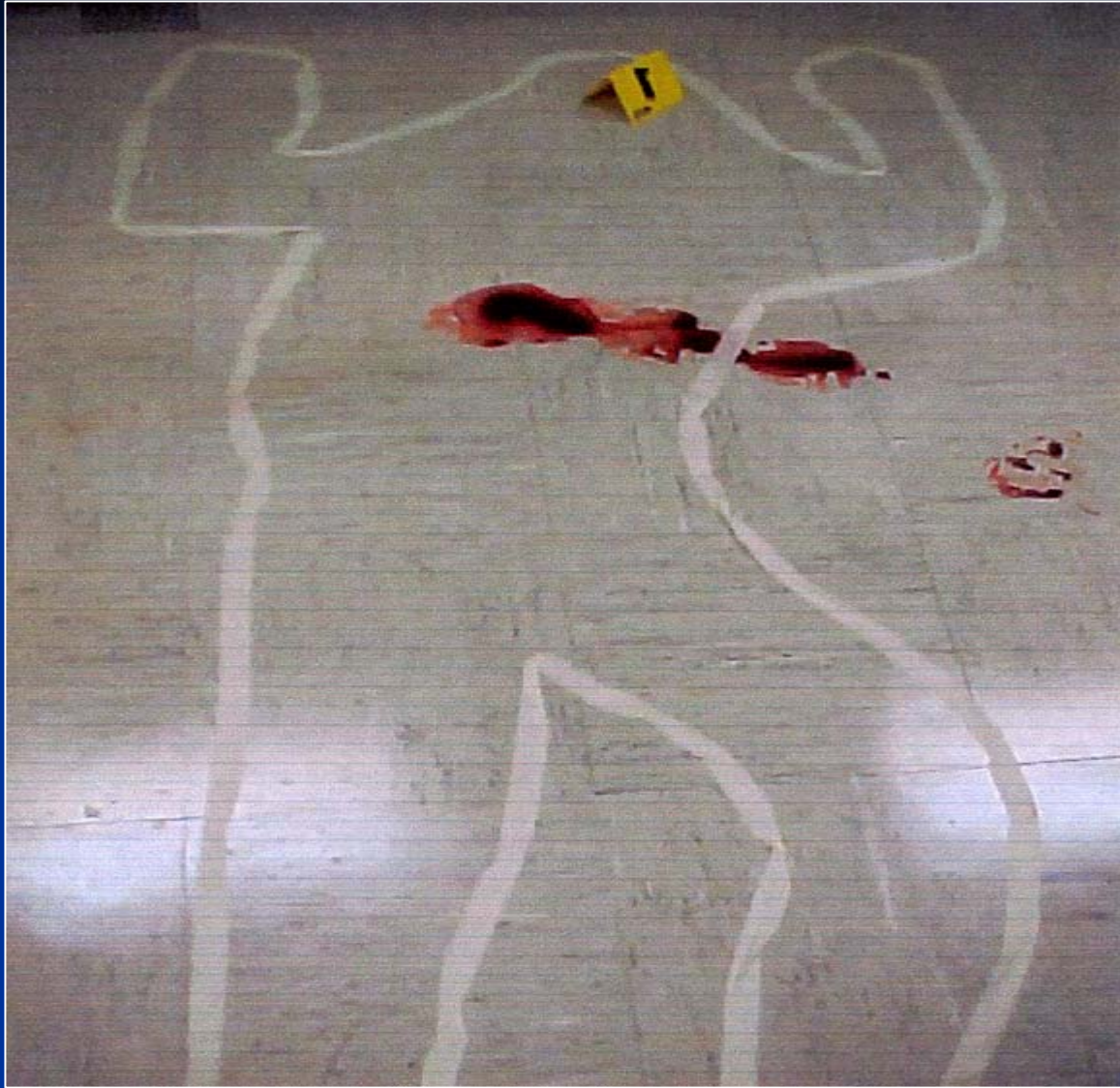
Semester 1

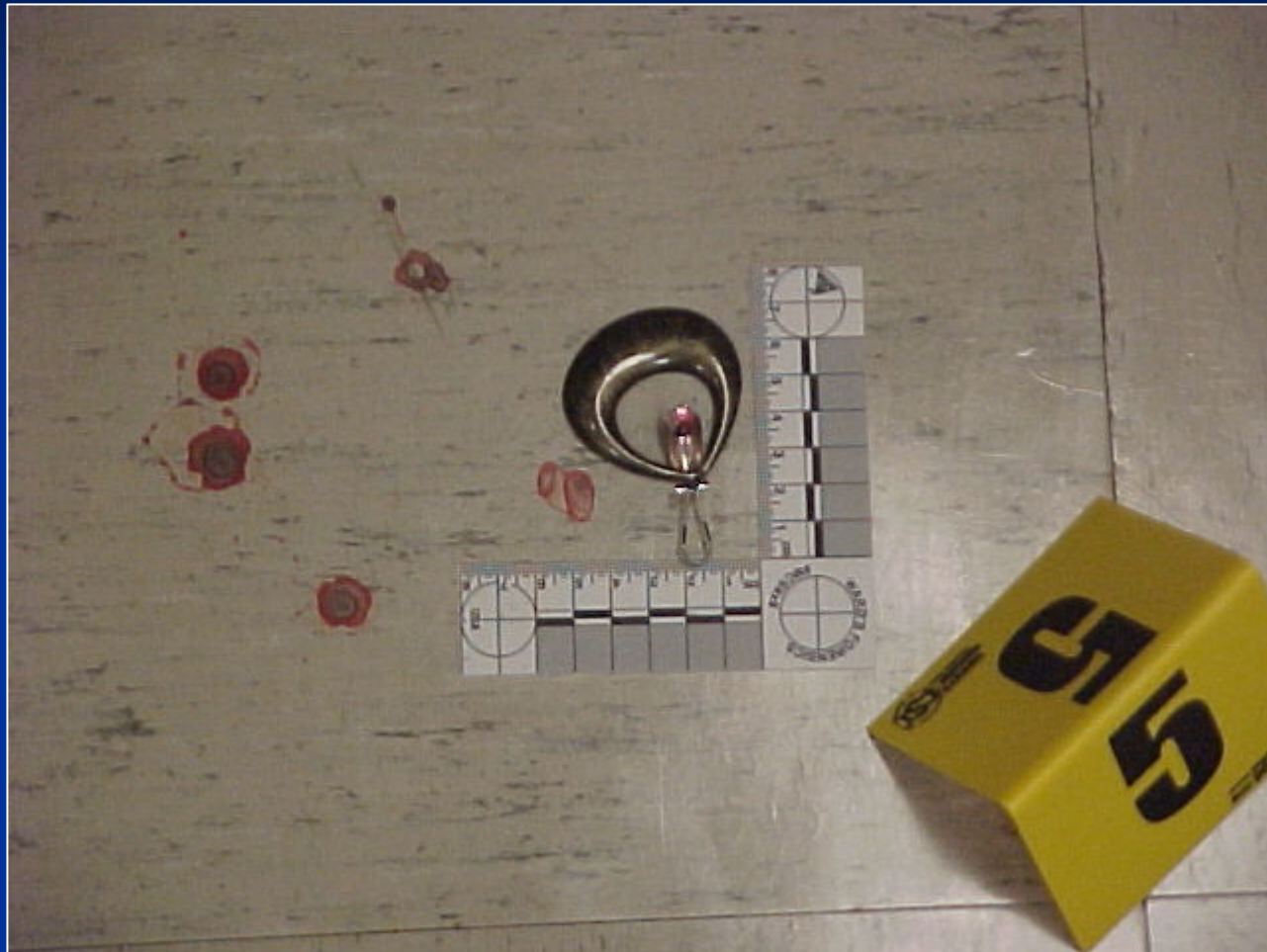
■ 1. Forensic Science and the Law

- * Introduction to Forensic Science
- * Evidence Analysis
- * Law
- *Crime Scene
- Careers in Forensic Science
- Mass Fatalities

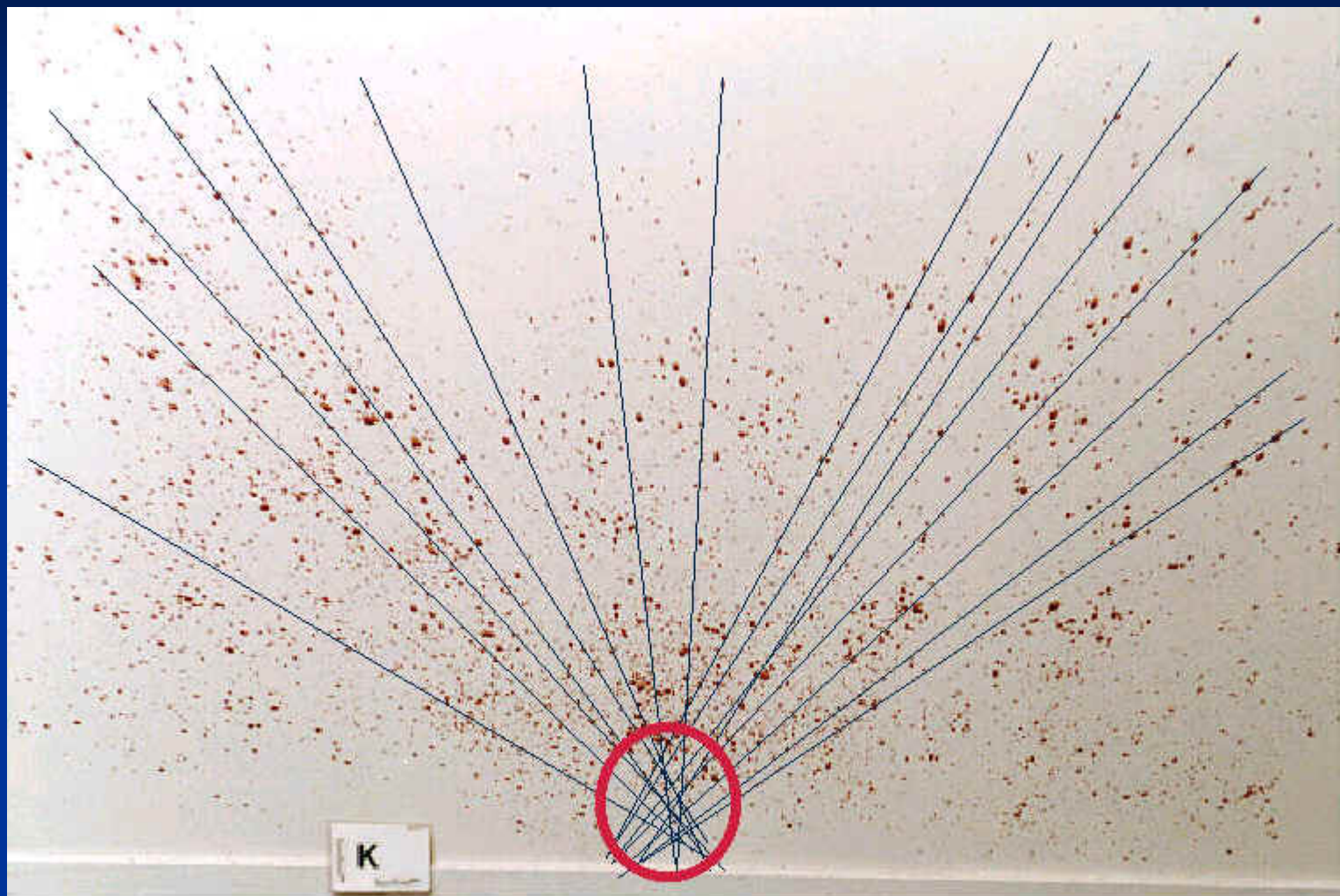
■ 2. Biological Science - Is it human?

- *Anthropology
- *DNA
- *Hair
- Serology and Blood Patterns
- *Time of Death
 - a. Entomology
 - b. Pathology
- Odontology



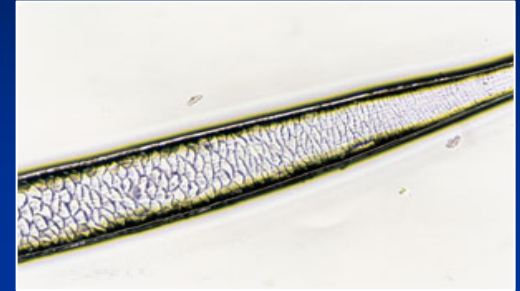














cat



COW



deer



dog



mink



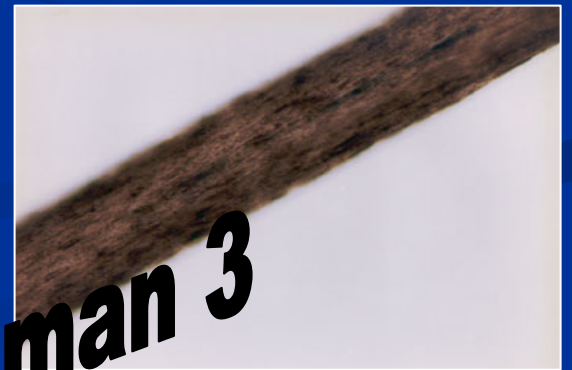
rabbit



human 1



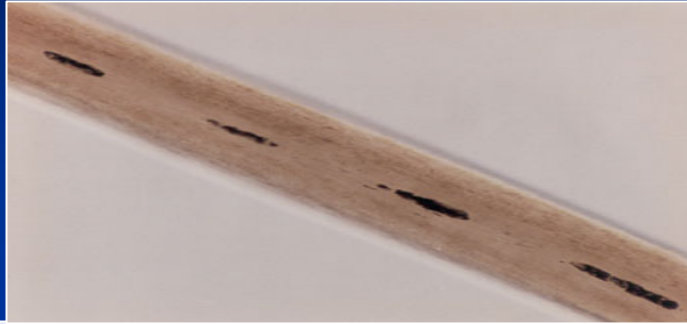
human 2



human 3

Human Hair

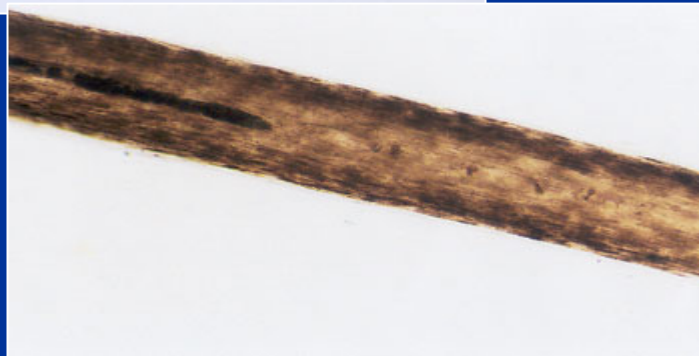
- Mongloid



- Negroid

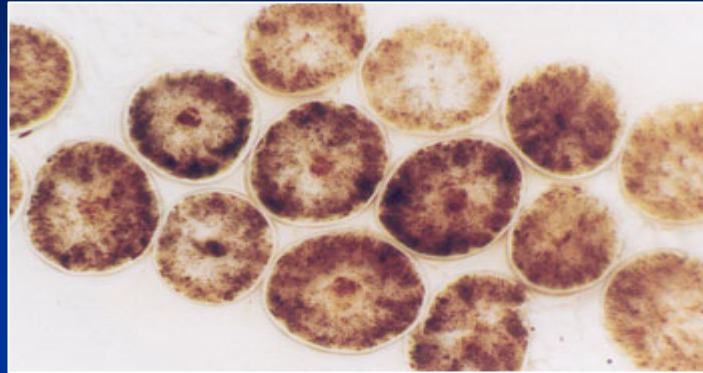


- Caucasian



Human Hair

- Mongloid

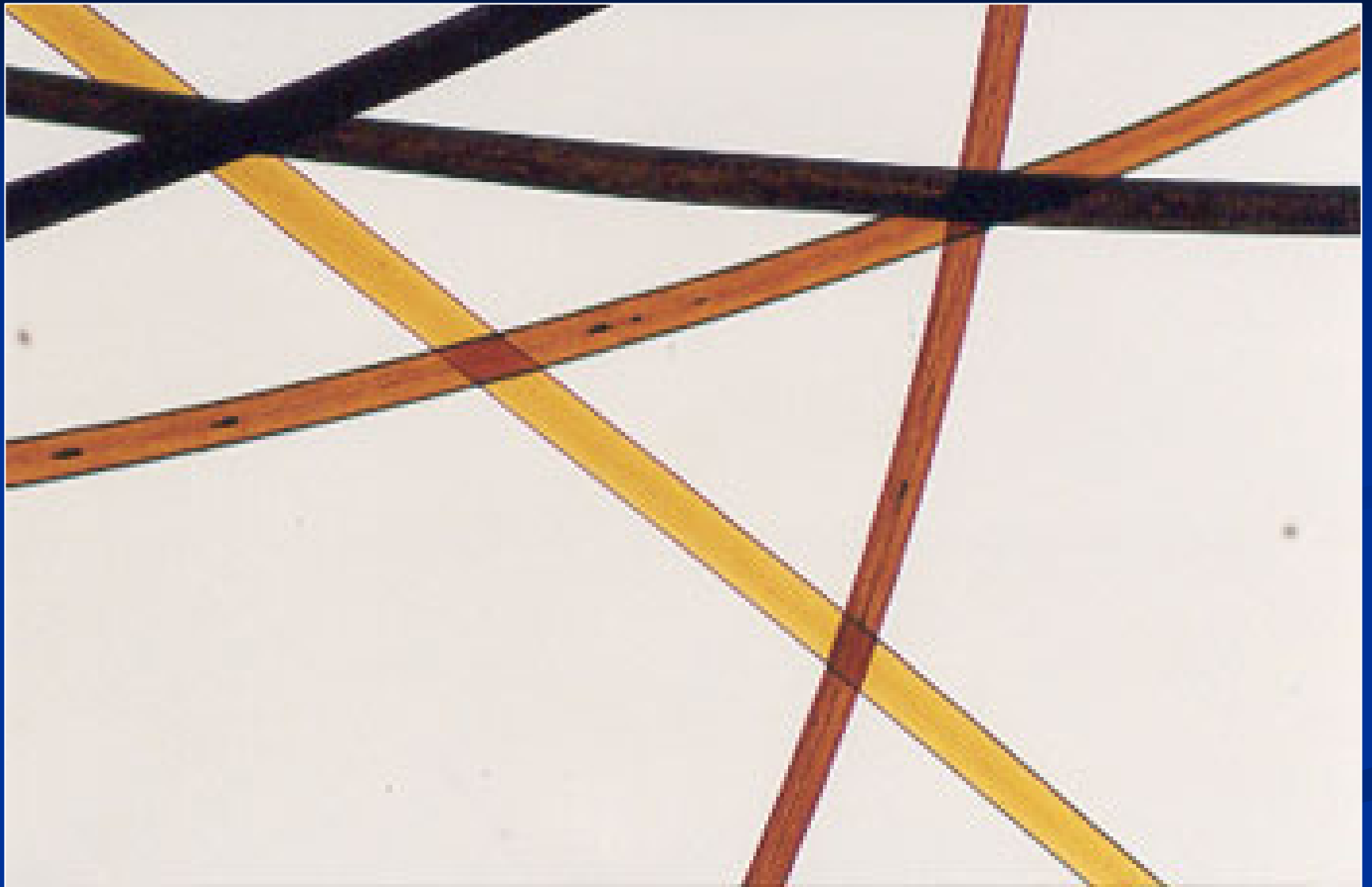


- Negroid



- Caucasian





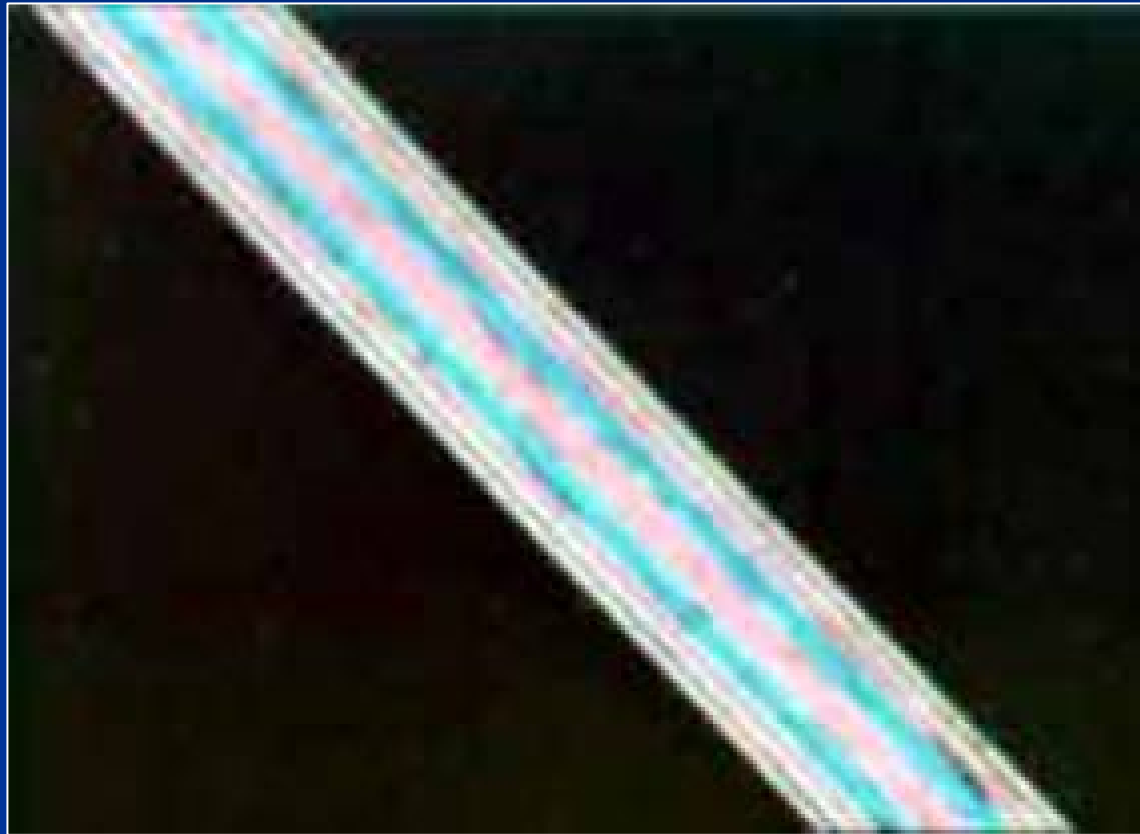
Semester 2

■ 3. Chemical Science

- *Fiber
- Glass, Soil, Paint
- Fire
- Explosives
- Toxicology

■ 4. Physical Science

- Criminal Profiling
- *Fingerprint
- Firearms/Ballistics
- Internet
- Questioned Documents
- Tool marks and Impressions



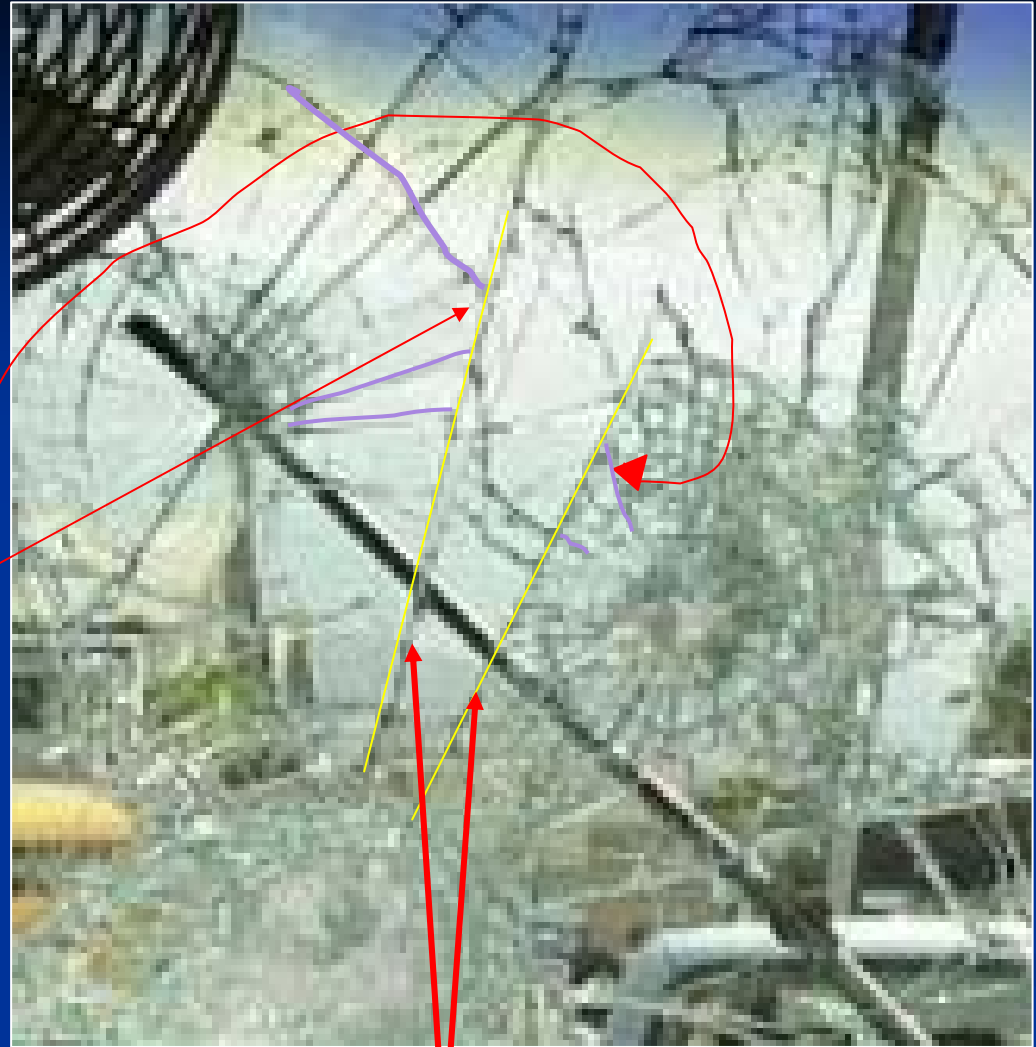
Nylon Carpet



Different cross-sectional patterns
can be patented



concentric
fractures from
secondary bullets
terminate at
fractures from
first bullet

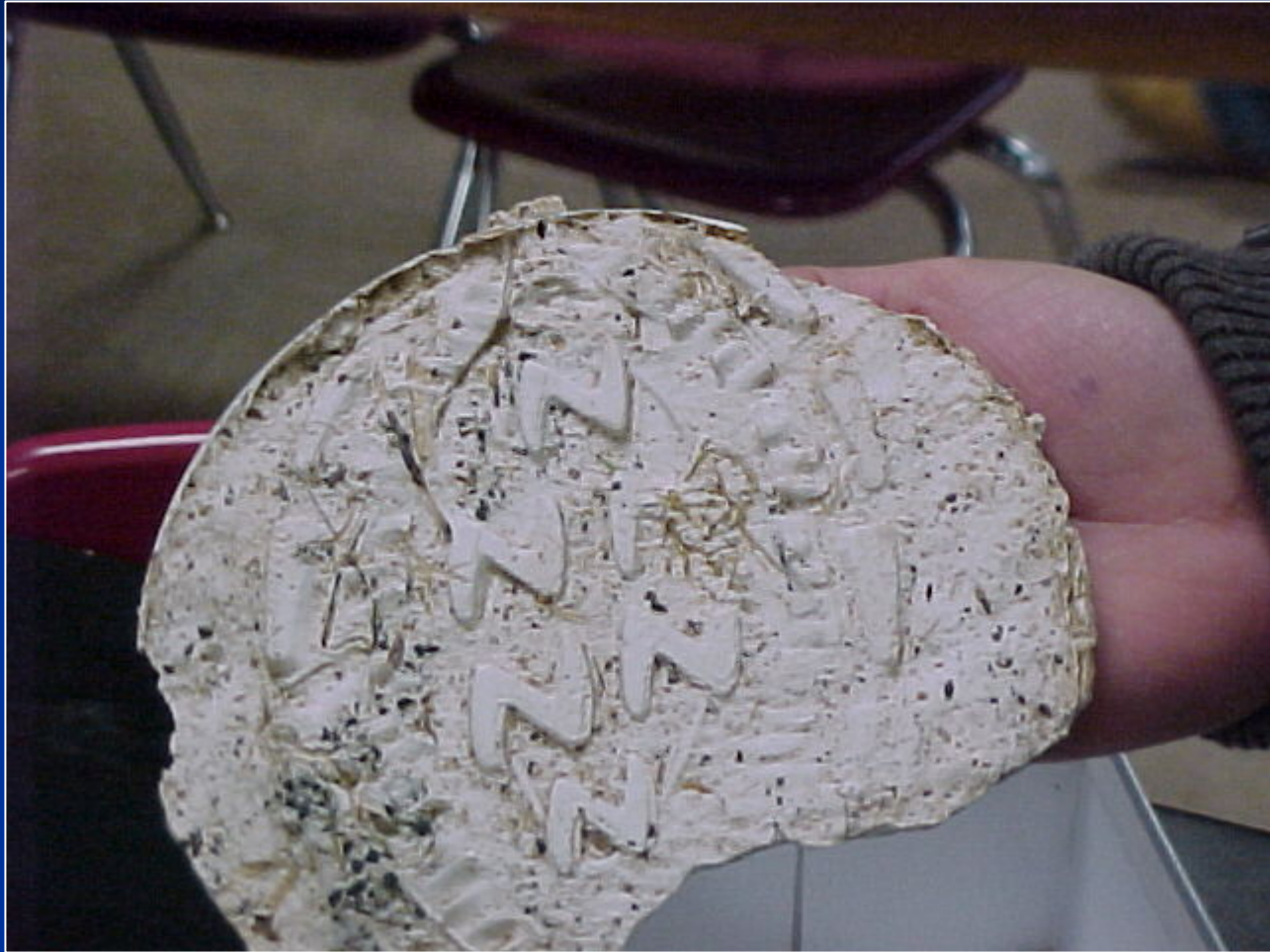


radial cracks from first bullet









With scientific knowledge, and critical thinking skills
acquired through forensic science;
students are poised to pursue further studies
in biology, chemistry,
physics, anatomy, anthropology, law, and medicine.

Enduring Understandings

1-4

Forensic Science is the application of
various sciences to those criminal
and civil laws that are enforced
by police agencies in a criminal
justice system

**Forensic evidence is evaluated
using controlled scientific
techniques.**

Various court cases throughout the years have set guidelines created specifically designed to set parameters around the type of evidence and how it is collected, processed, tested and presented in a court of law.

Forensic scientists come from many different fields of specialization.

Anthropologists	Odontologists	Ridge pattern specialists
Entomologists	Footwear/Toolmark	X-Ray specialists
Toxicologists	Pathologists	Hair/Fiber
Serologists	Biology	Glass and Paint
Soil/Glass/Paint	Questioned Documents	Geologists
Photographers	Computer specialists	Explosives

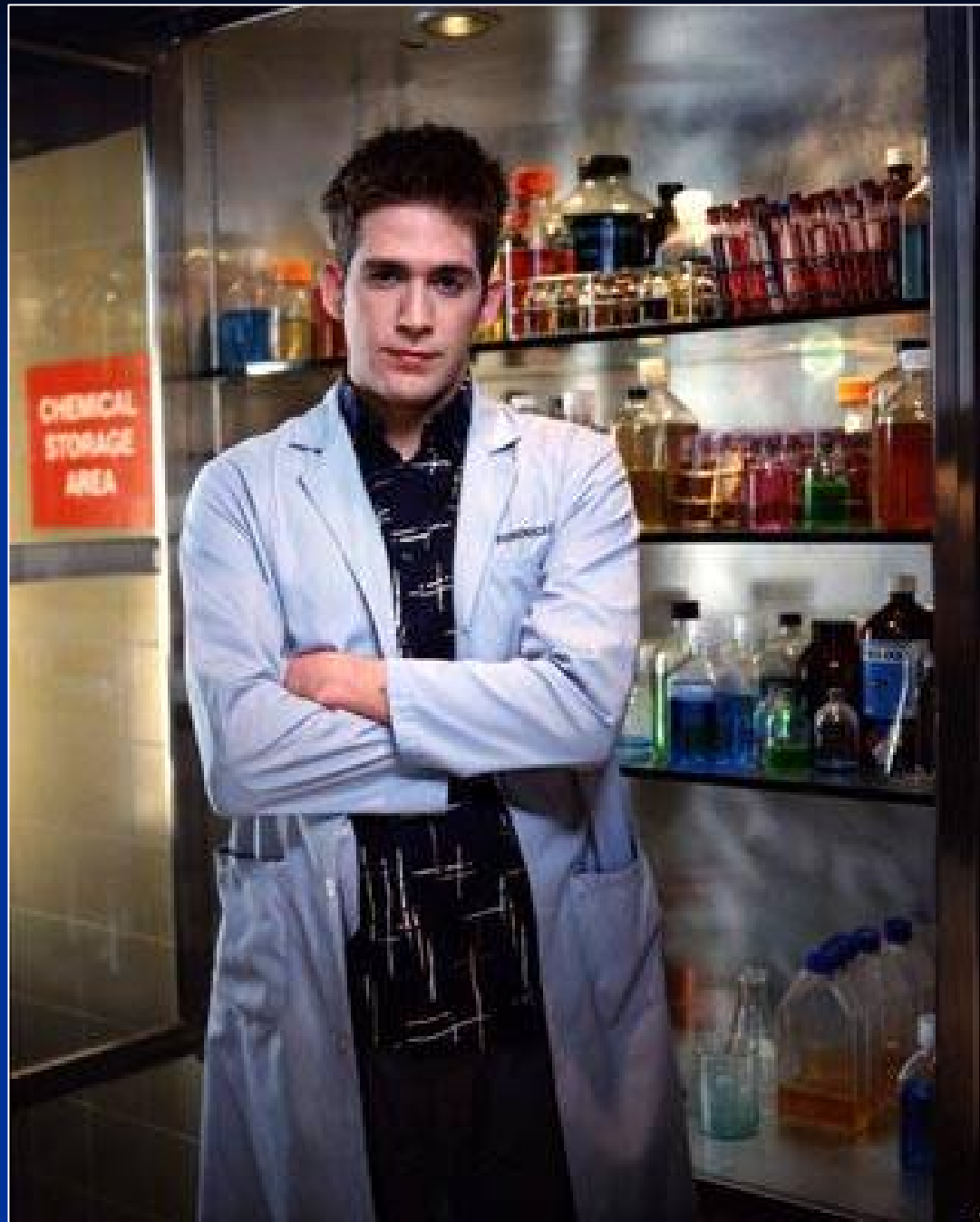
Forensic science begins at the crime scene.

- First Responder - Securing the scene
- Scene documentation – Crime scene sketches, photography
- Collection of evidence - Chain of Custody begins



TV

- Court TV
 - Forensic Files
 - Body of Evidence
 - Cold Case Files



Problems with CSI

Interrogation of witnesses done by police officers

Lab turn around-time is much longer

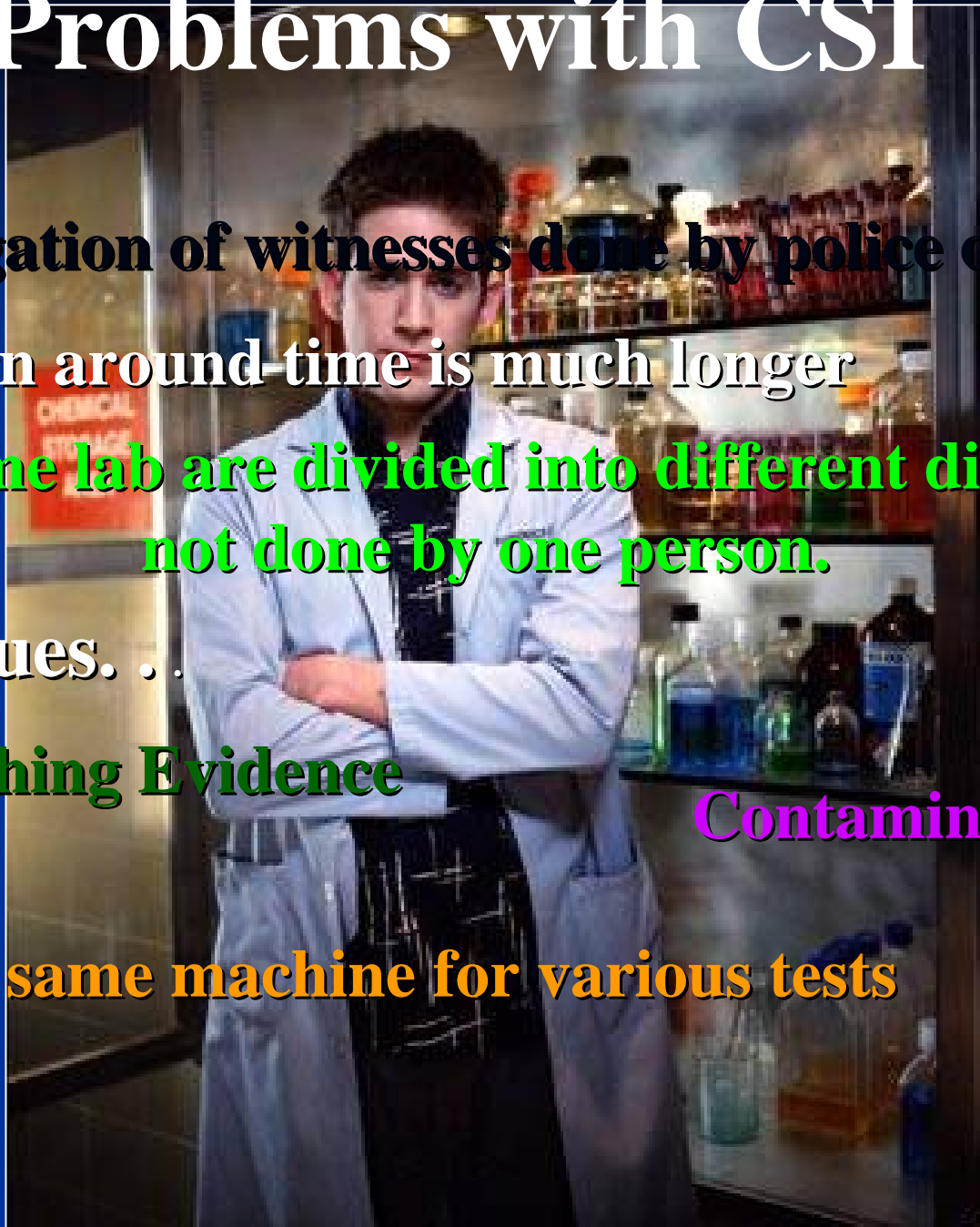
**Jobs in a crime lab are divided into different disciplines. . .
not done by one person.**

Other issues. . .

Photographing Evidence

Contamination

Using the same machine for various tests



Opportunities

<http://www.aafs.org>

Check out the site – lots of great information!

Student Artifacts

Student Artifacts

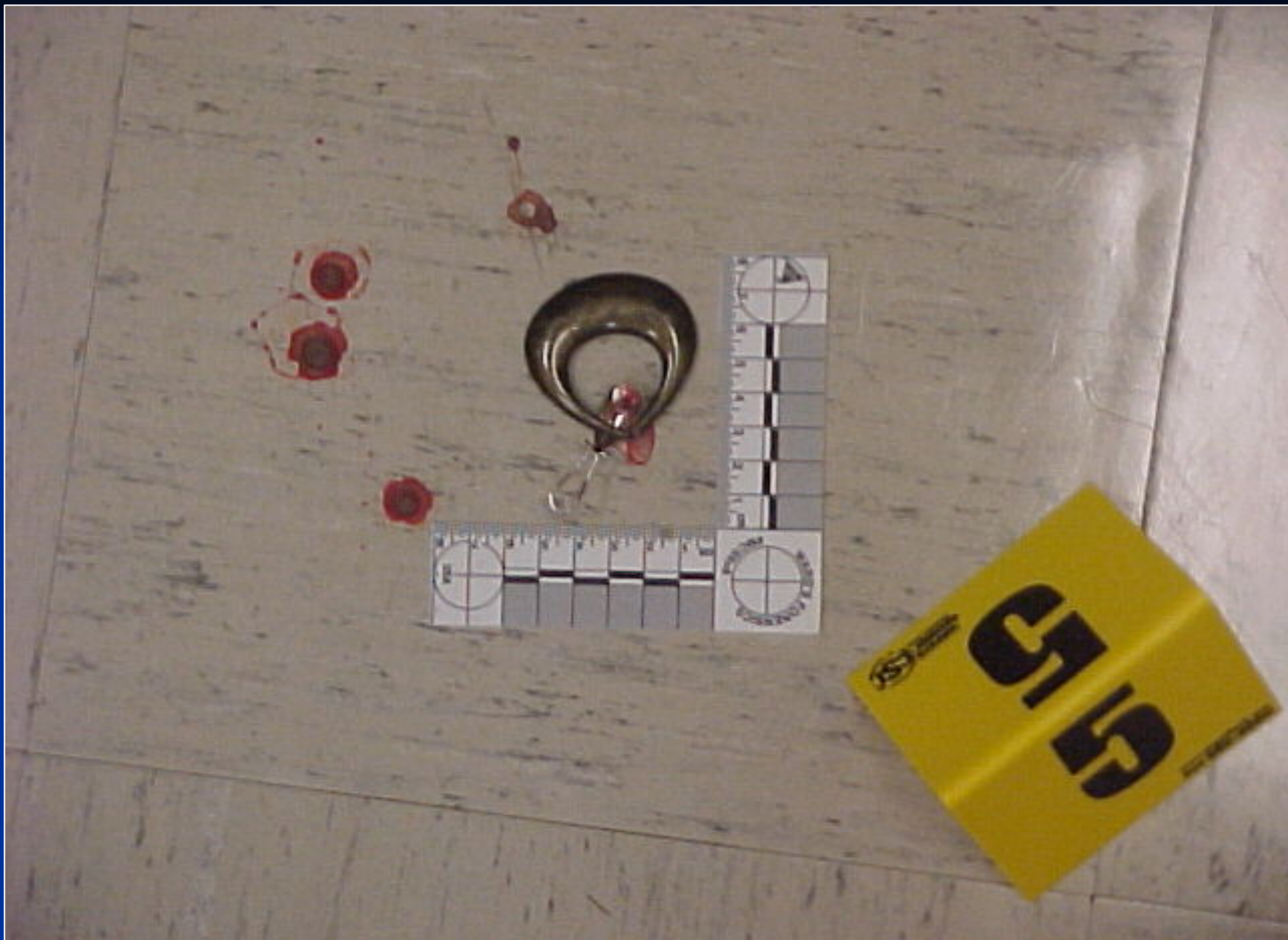
Lets get
jazzed

It is all about you, the *active* learner

The game is afoot..

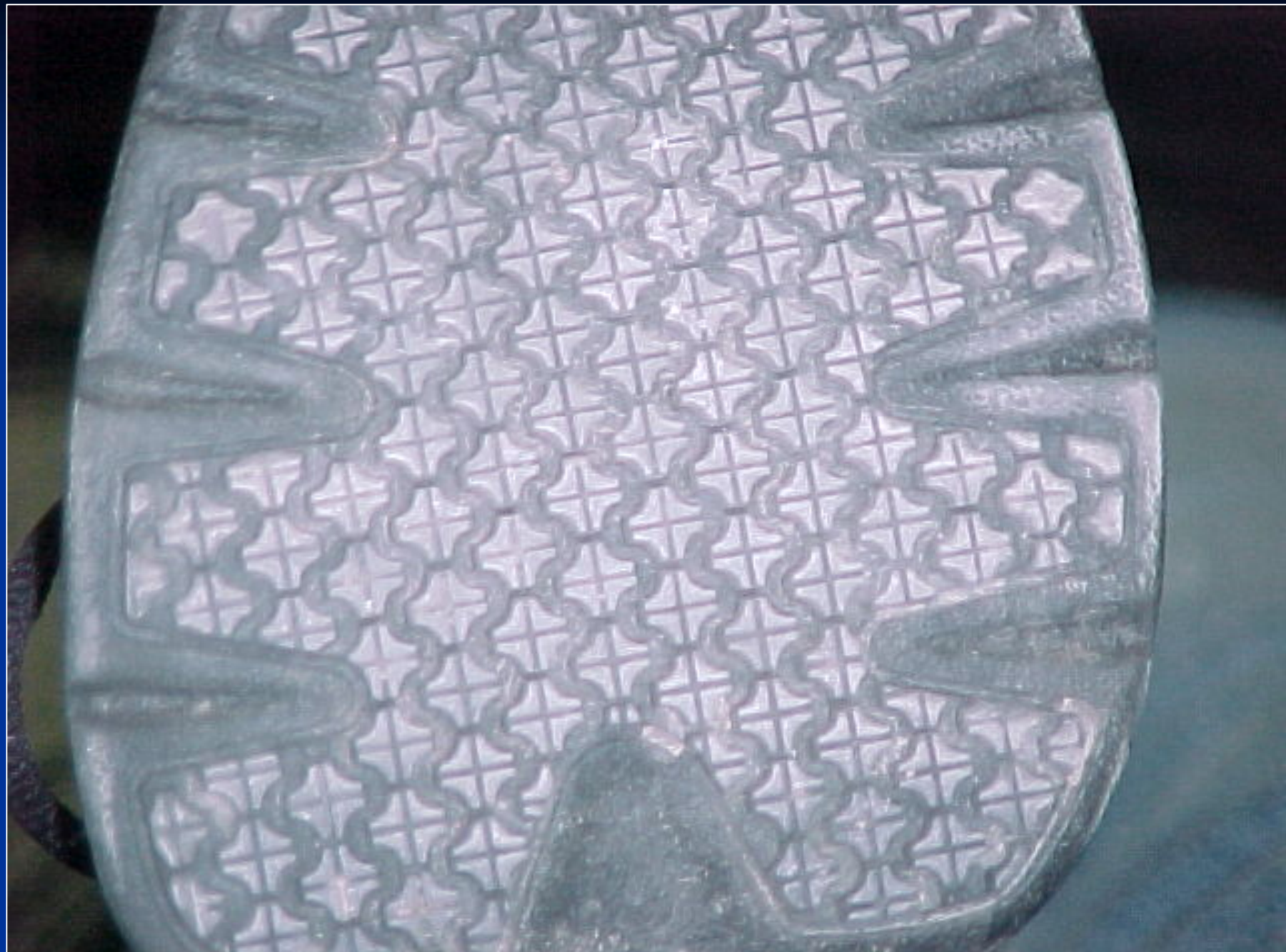




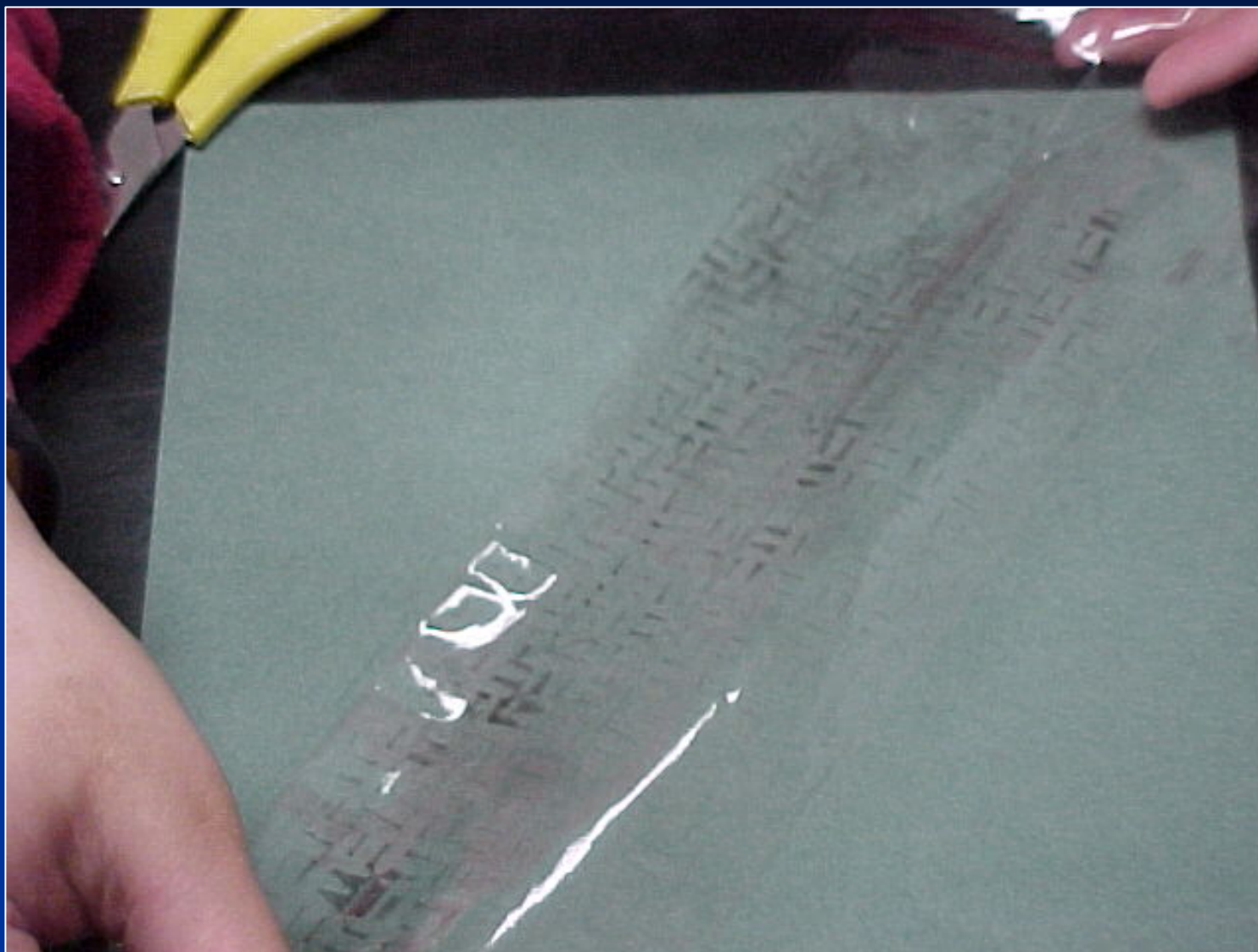




Impressions











NUMERUS
METACARPAL
CARPAL



HUMAN HEART

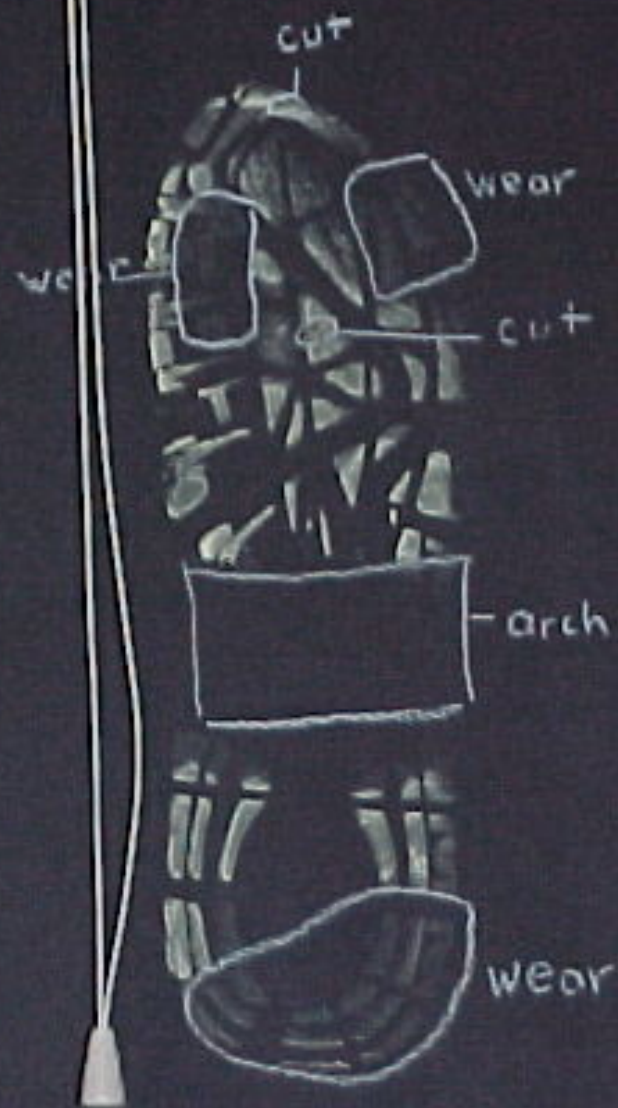
FORMED ELEMENTS



CHROMATIN
CHROMATID
CENTROMERE
CENTRIOLE
ASTRA
SPINDLE
CYTOPLASM



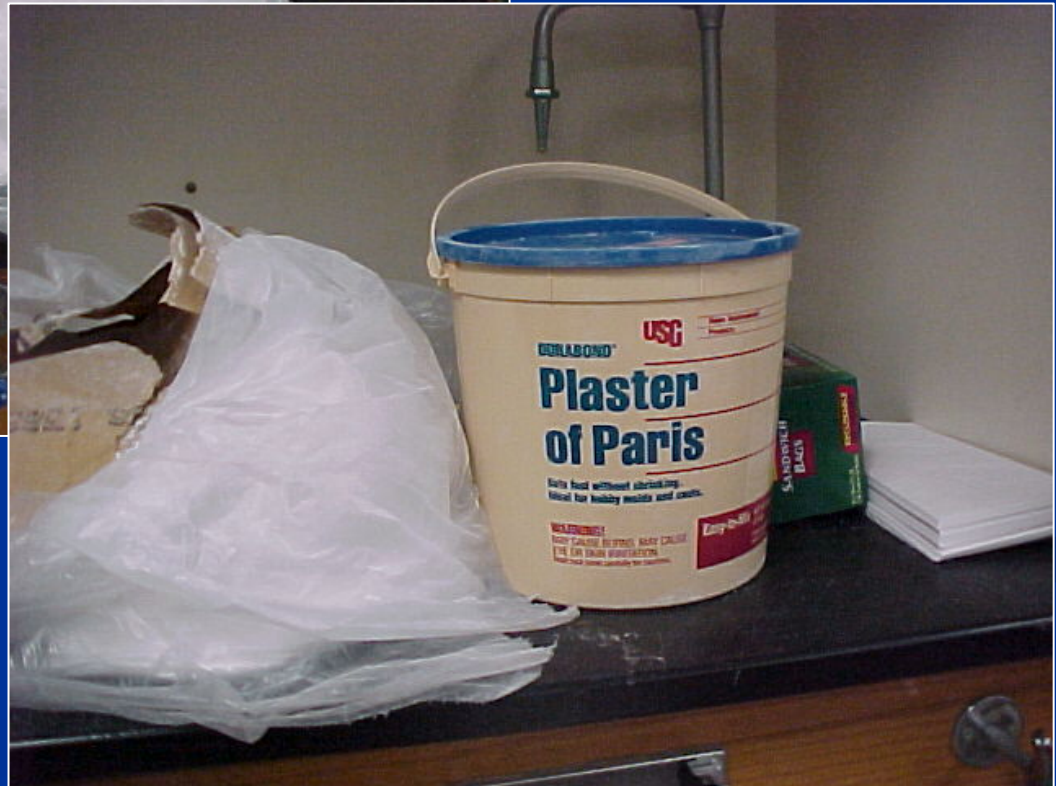
OPPOSITION CIRCUMDUCTION



Steph Lee



Lauren P
Hammer



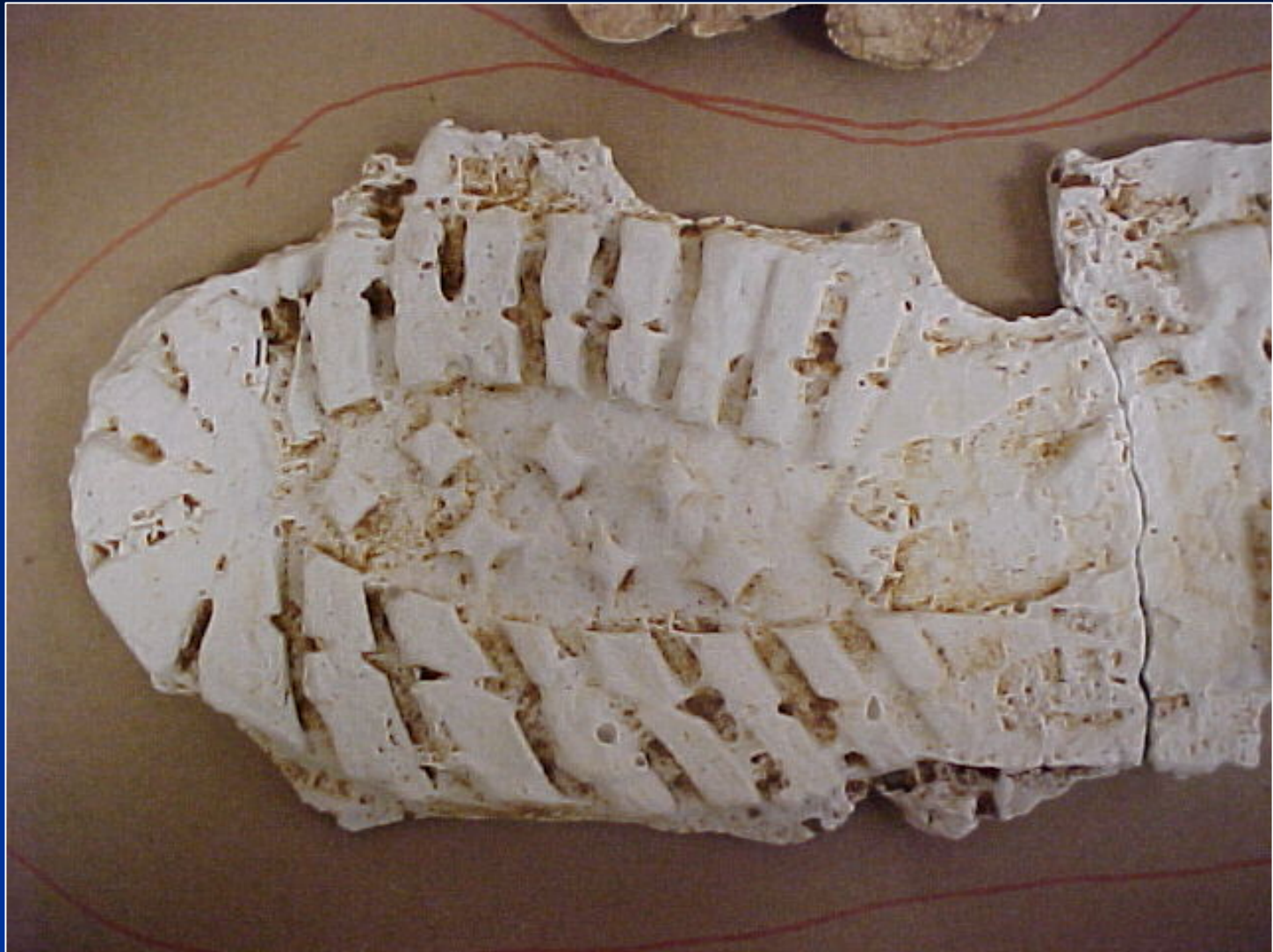












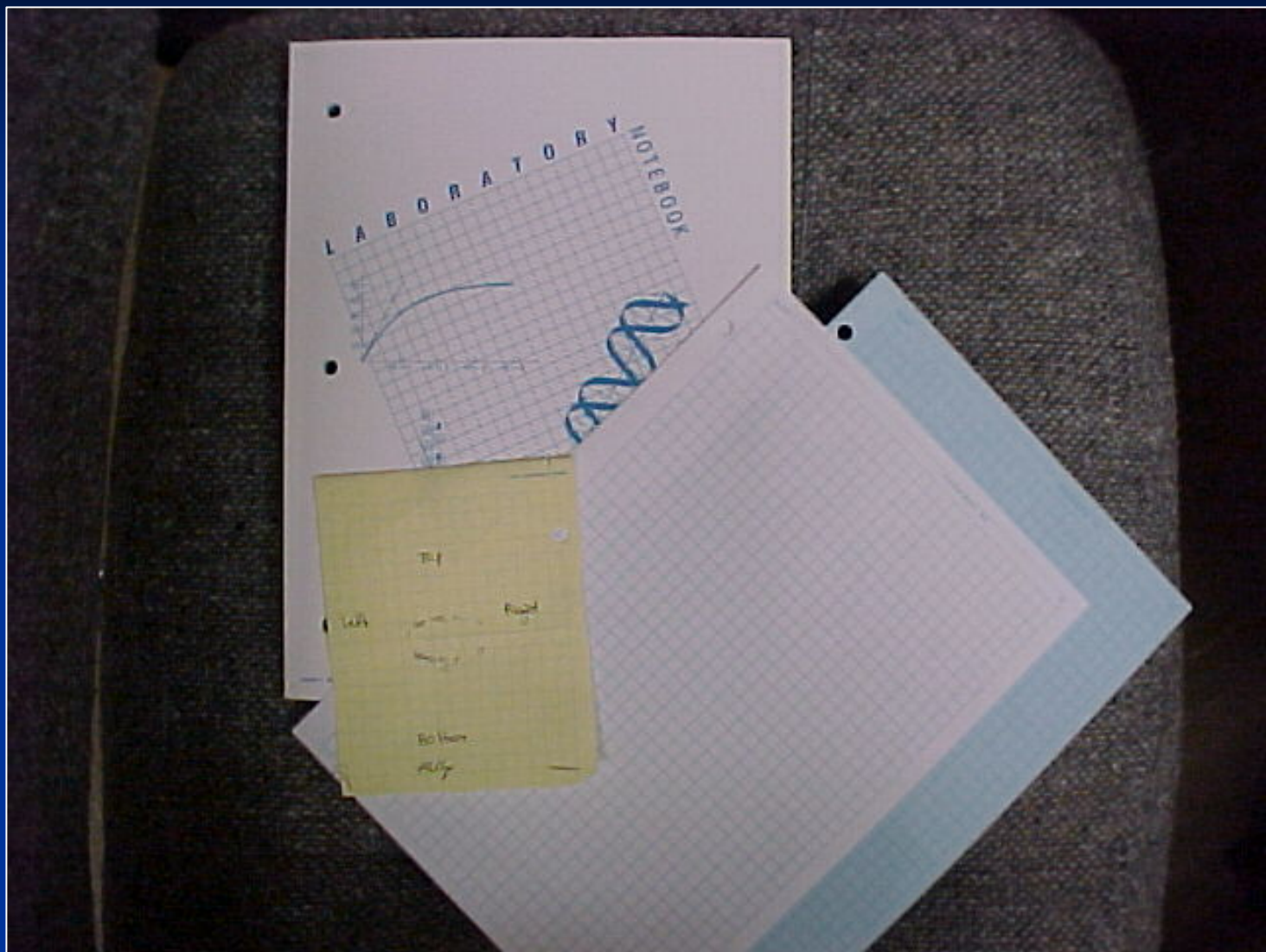


Is it human?



Bite Marks

Odontology



LABORATORY NOTEBOOK



Handwritten text on a yellow sticky note:

1.1

1.2

1.3

1.4

1.5

1.6

1.7

1.8

1.9

2.0

2.1

2.2

2.3

2.4

2.5

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2.7

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3.0

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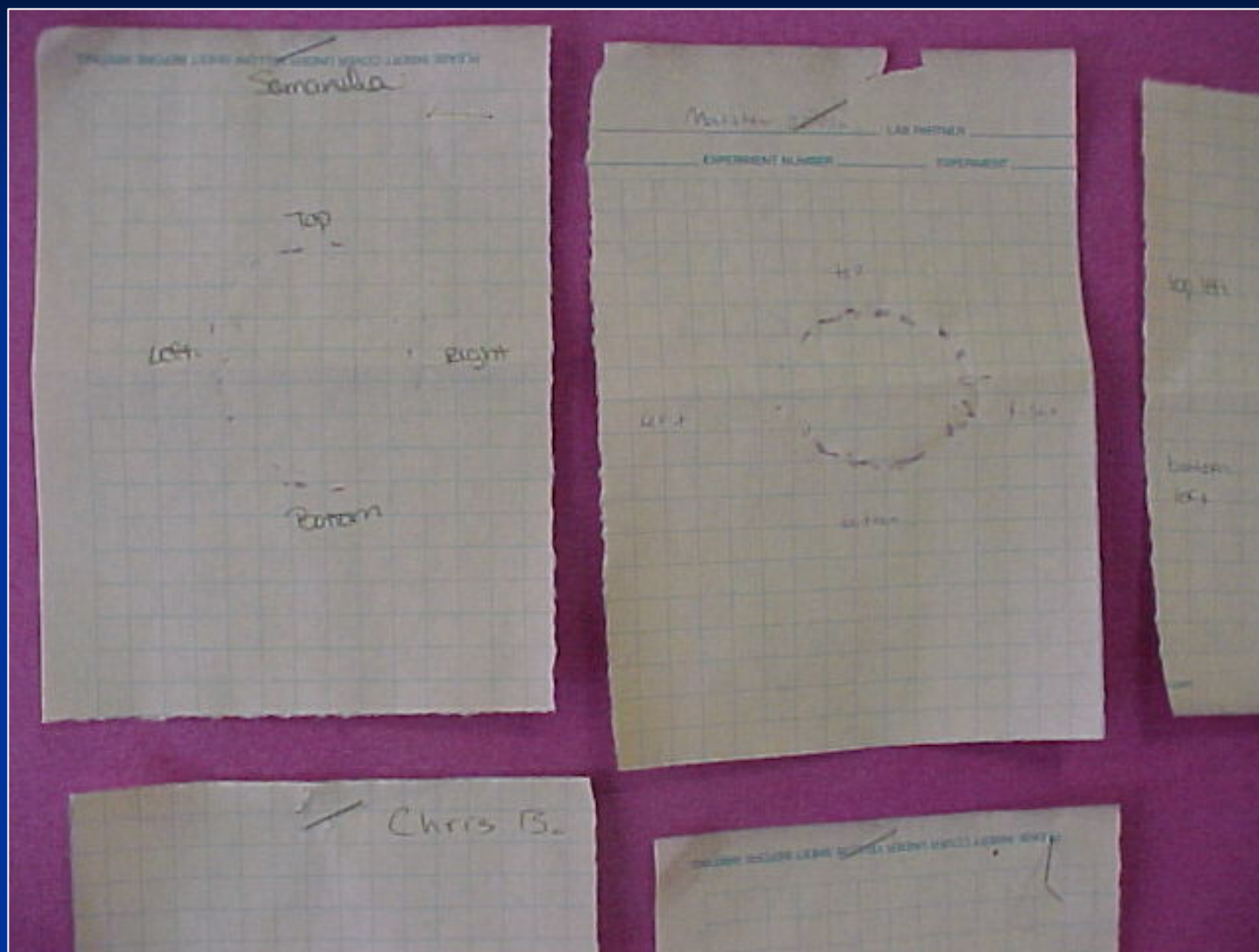
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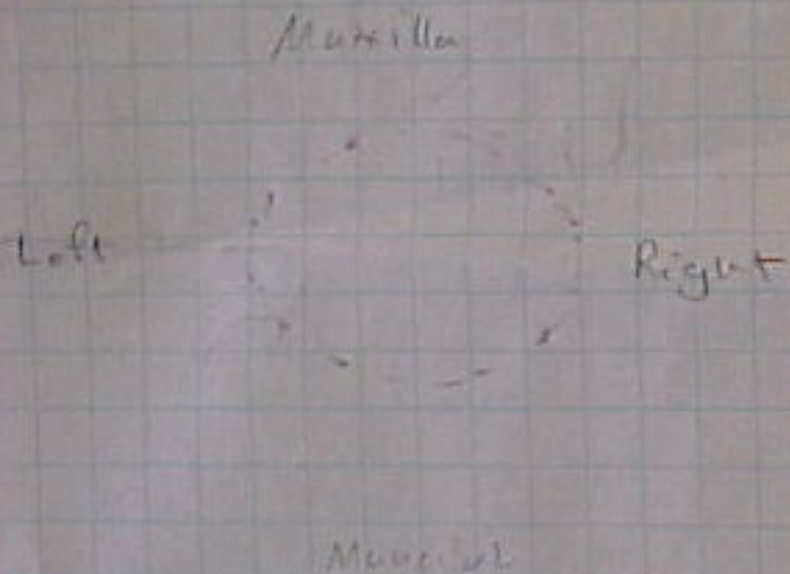
9.8

9.9

10.0



Chris B.



EXPERIMENT NUMBER

EXPERIMENT NUMBER

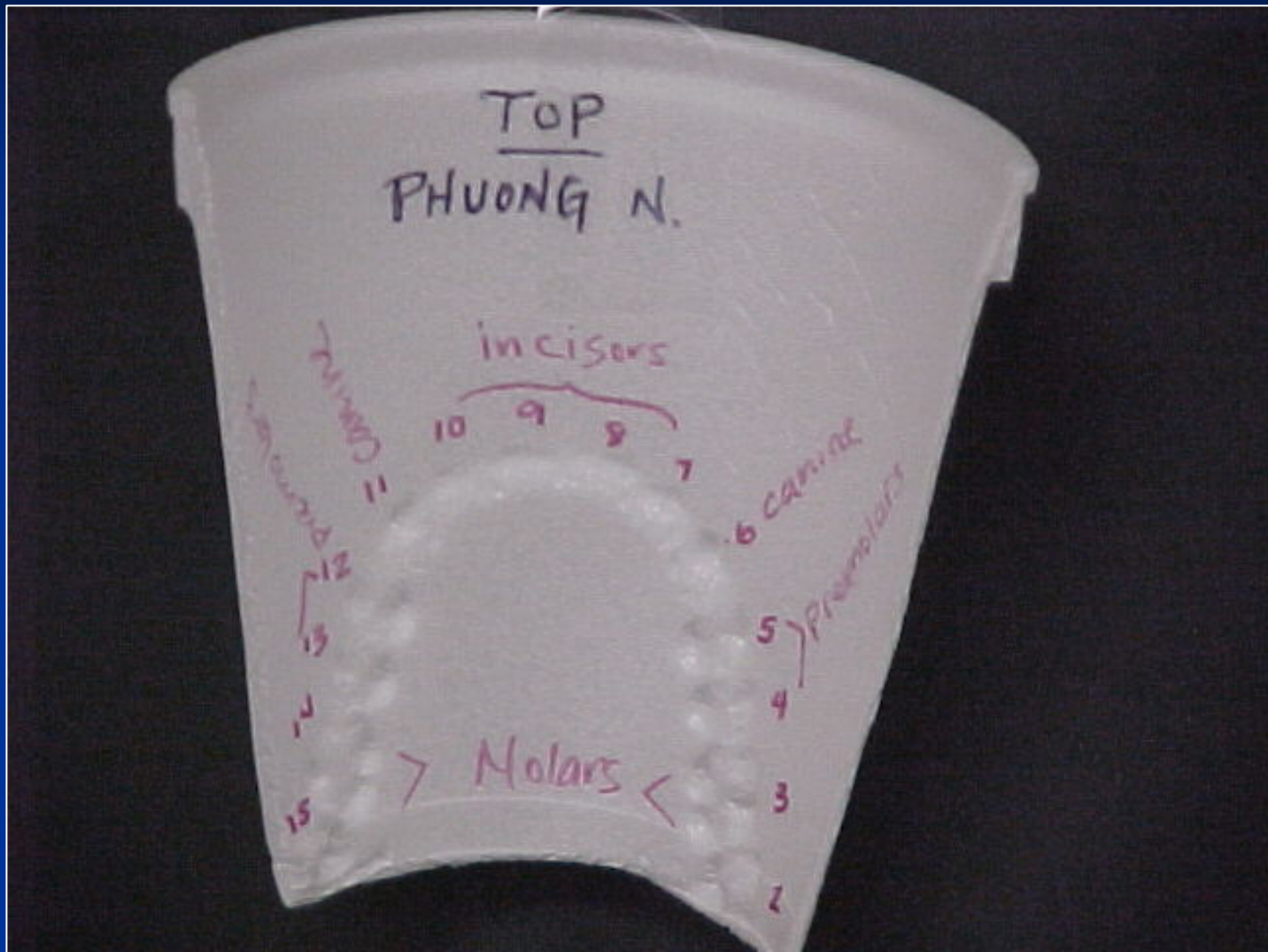
DATE

PLEASE INSERT COVER UNDER THE SHEET BEFORE WRITING

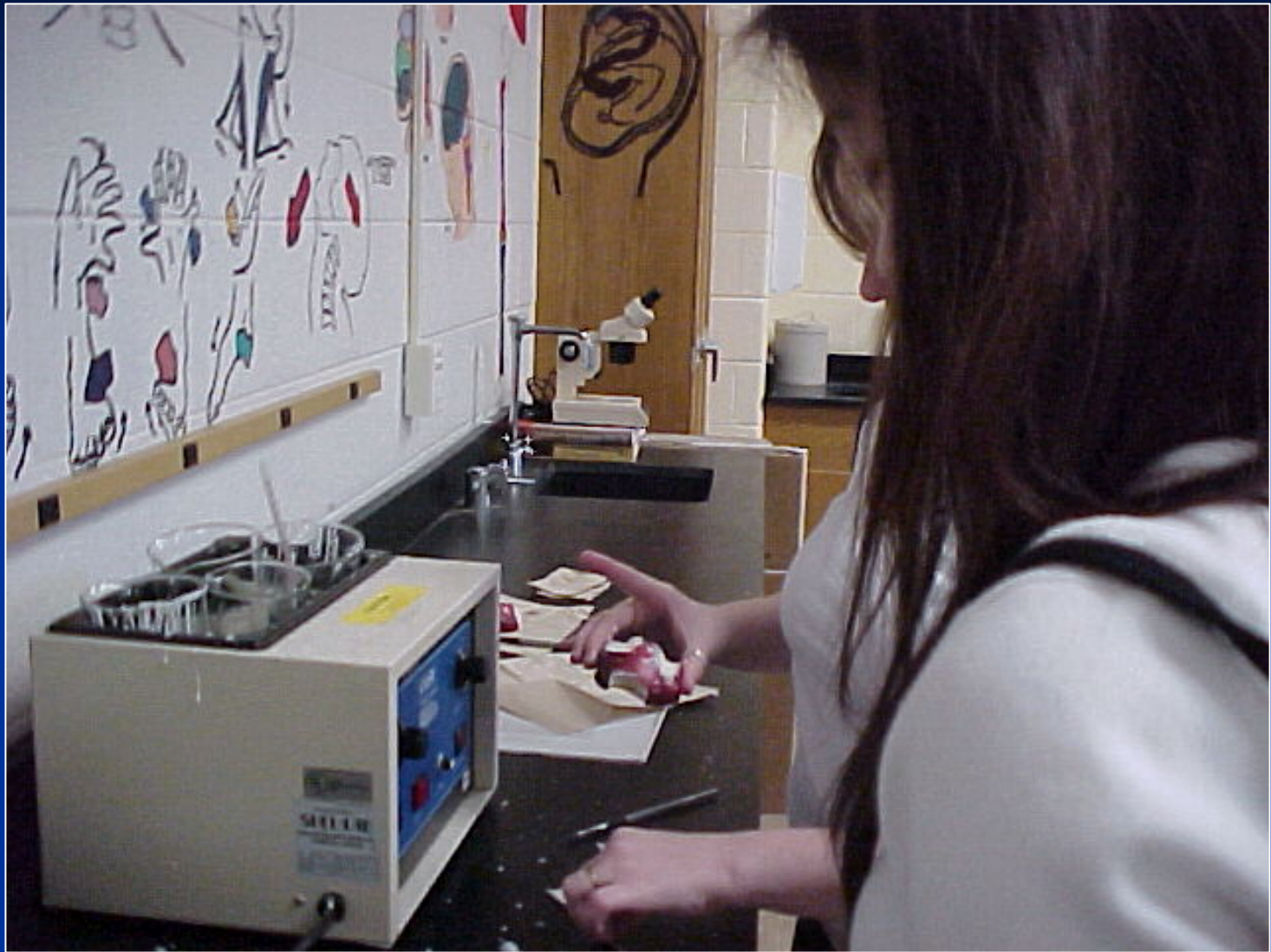


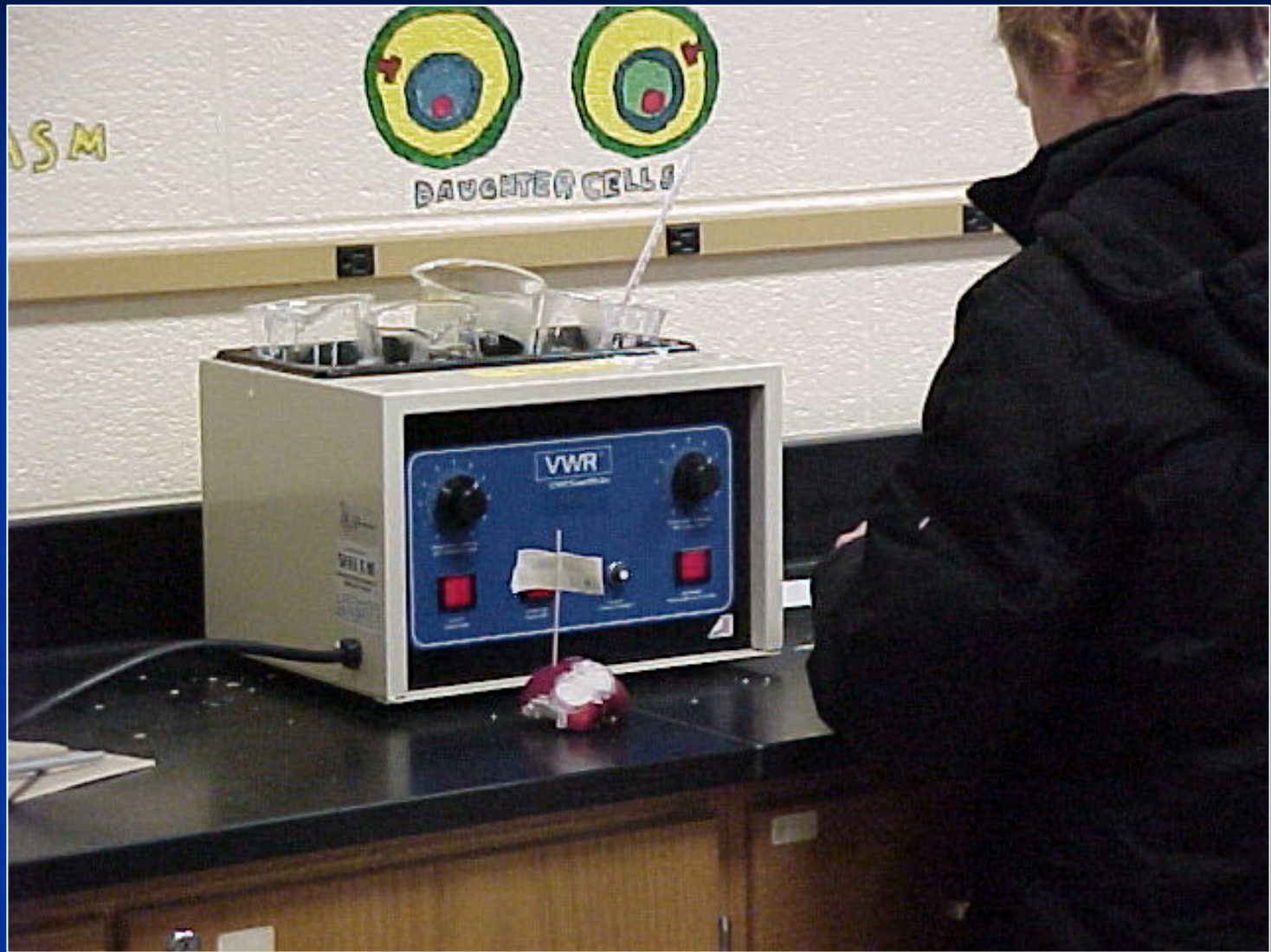
Practical

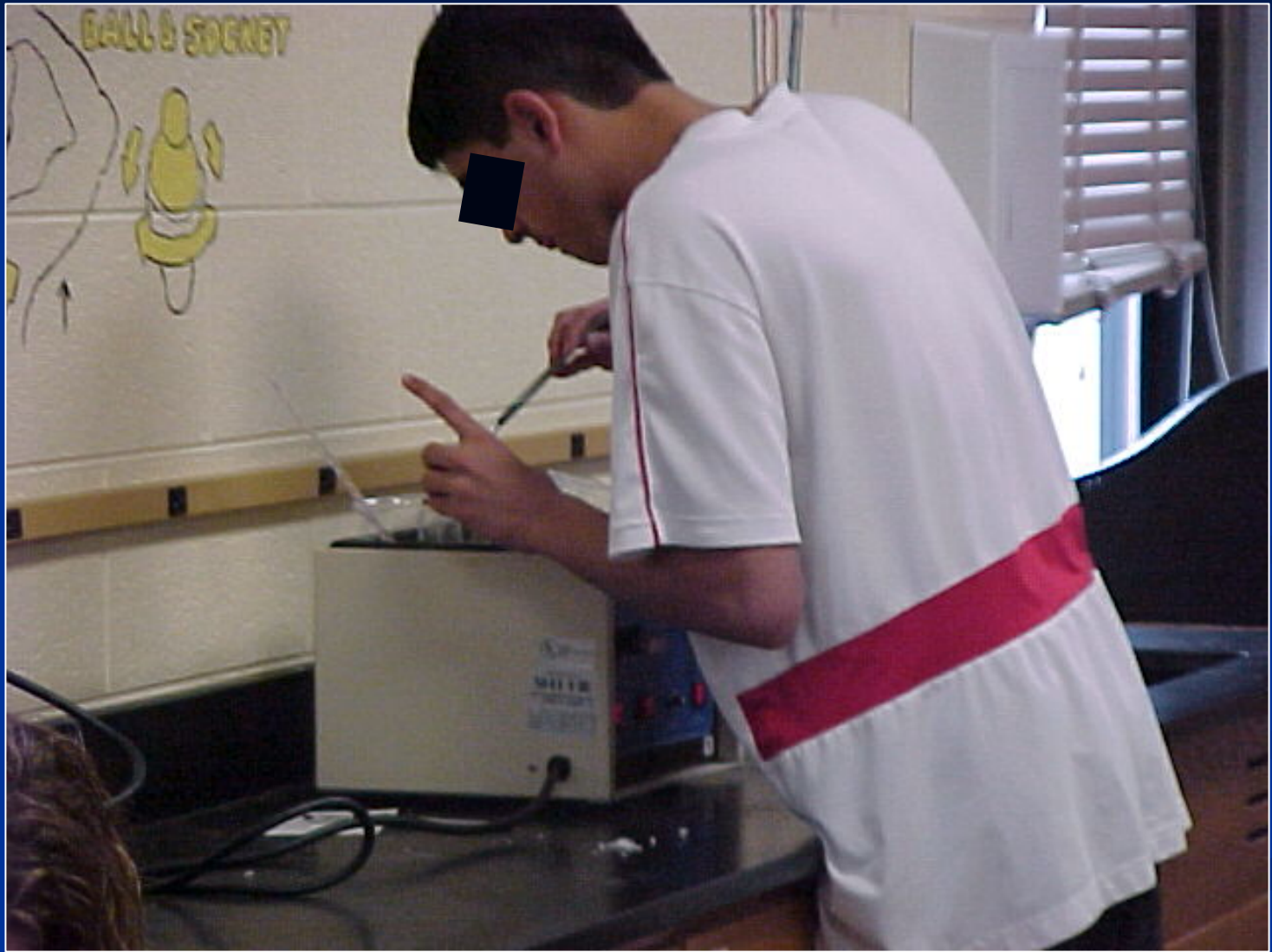








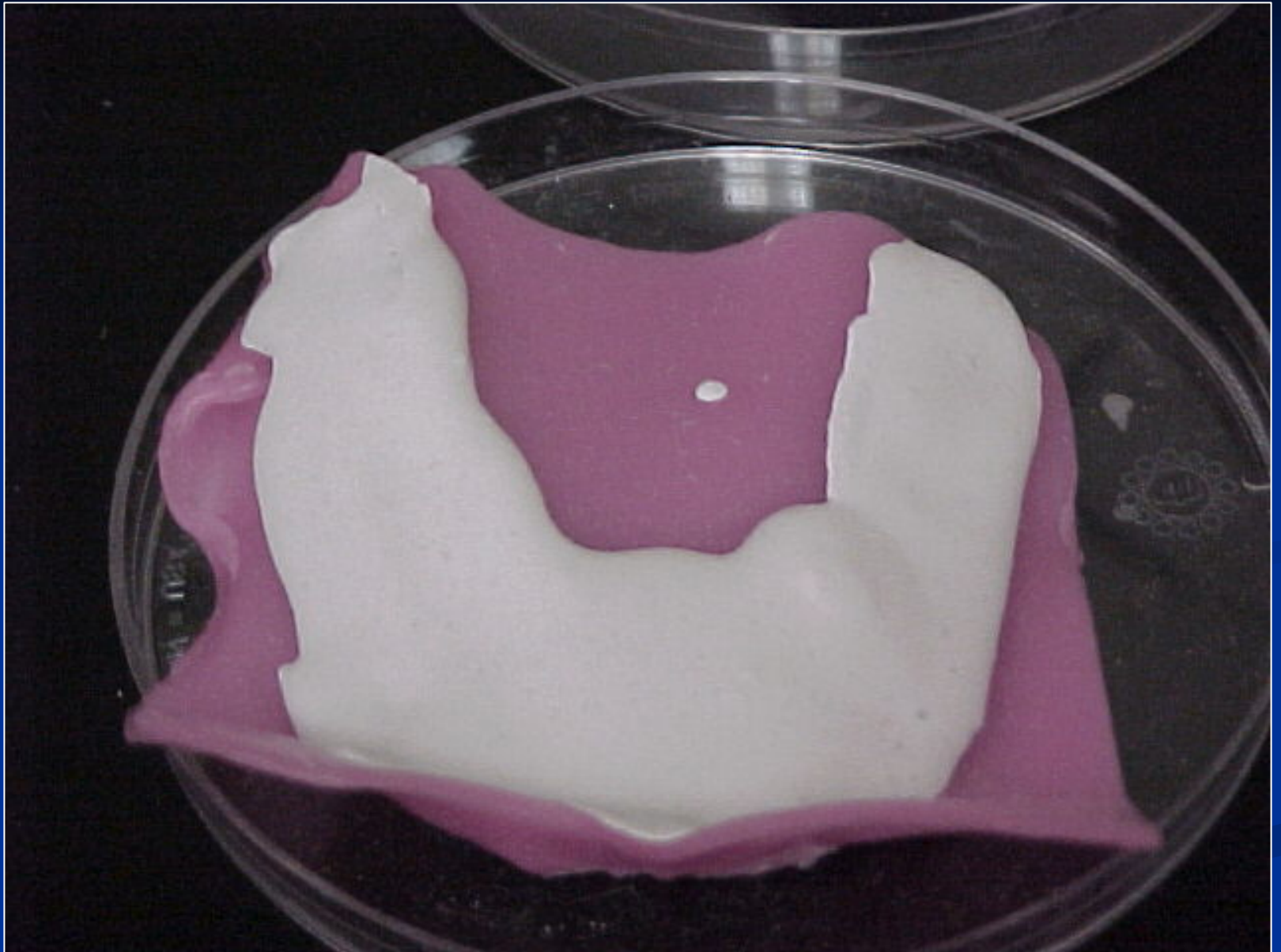
















Digital Bite Mark Analysis “Adobe Photoshop”





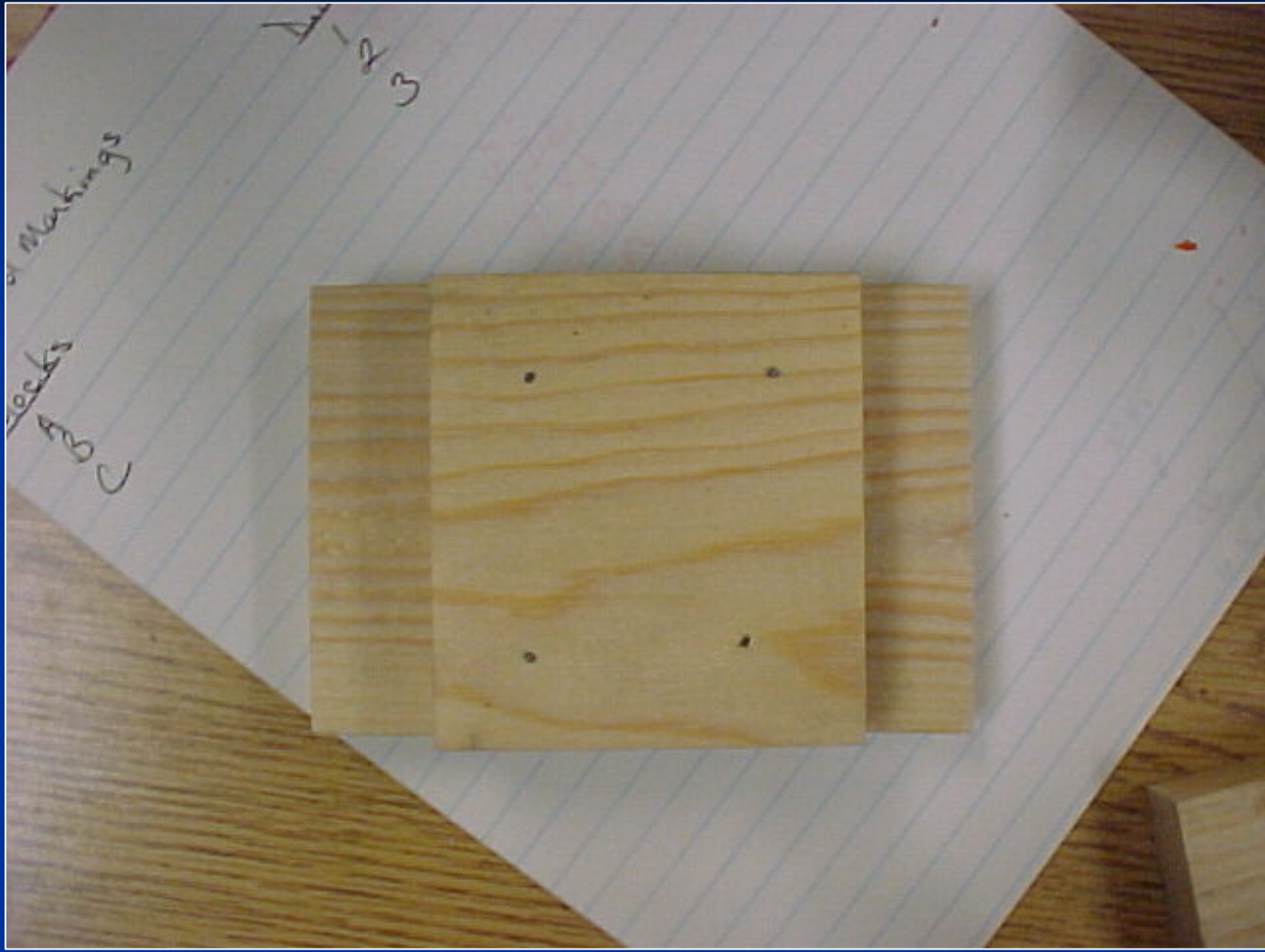


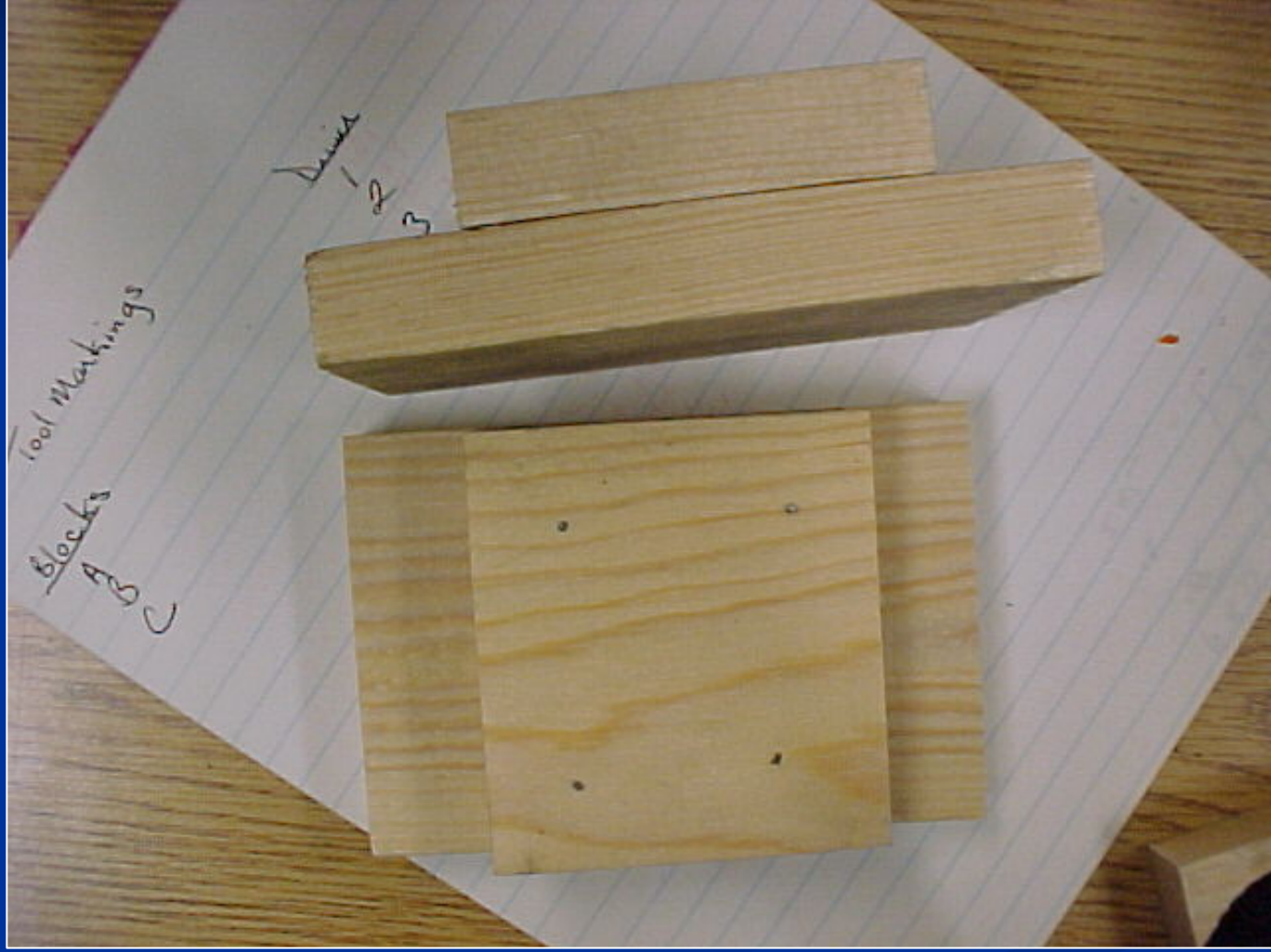


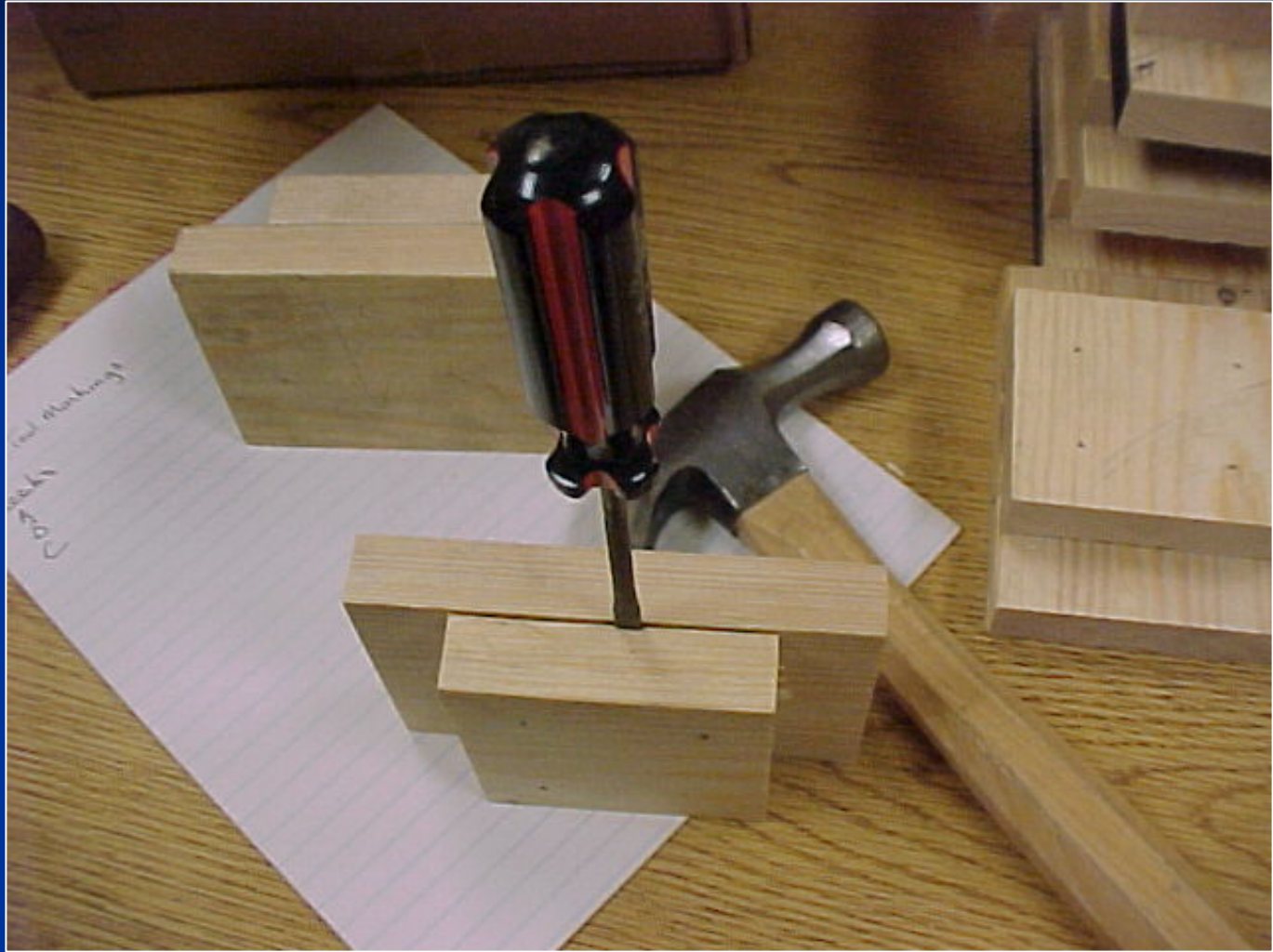




Tool Marks

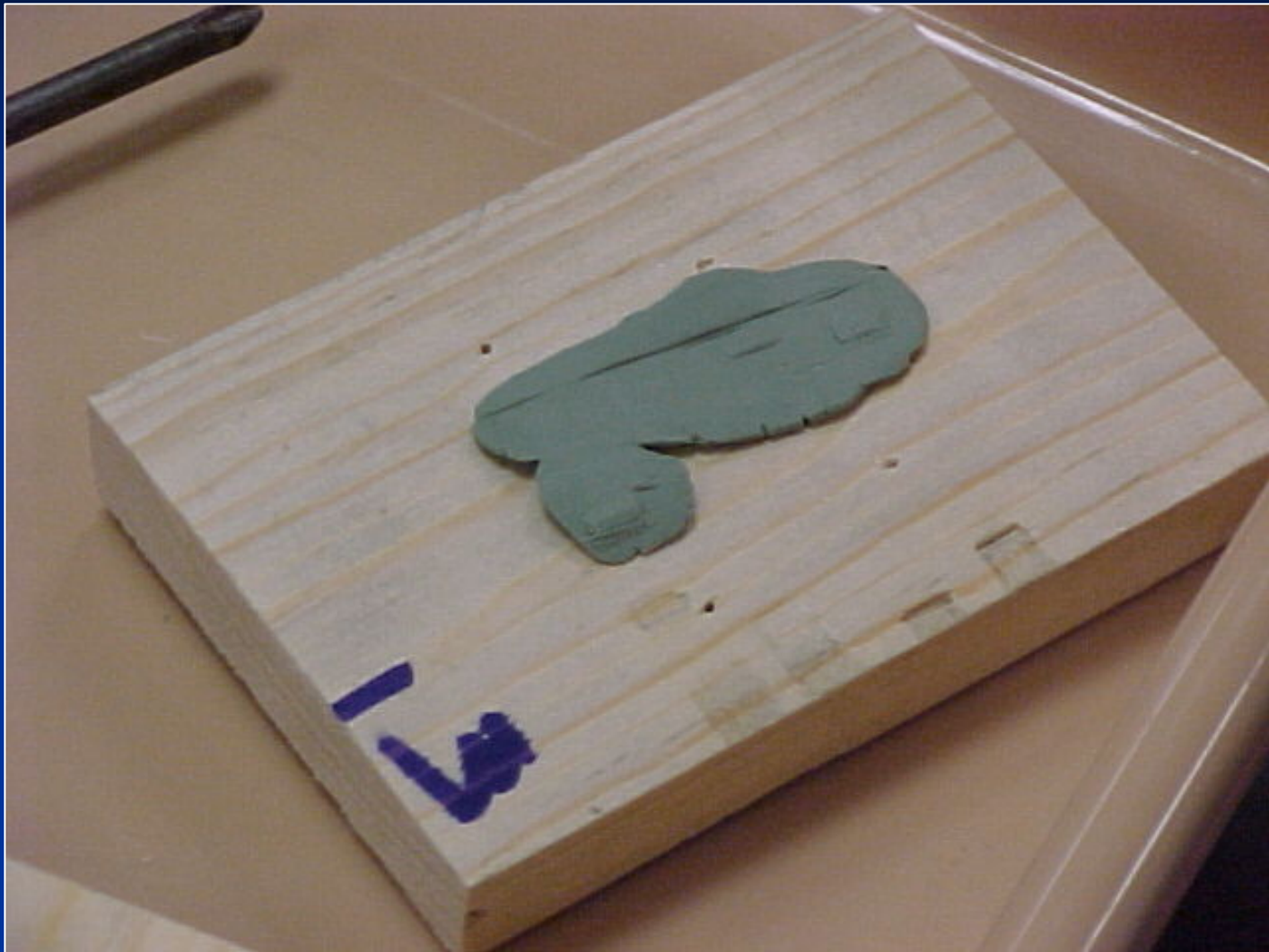


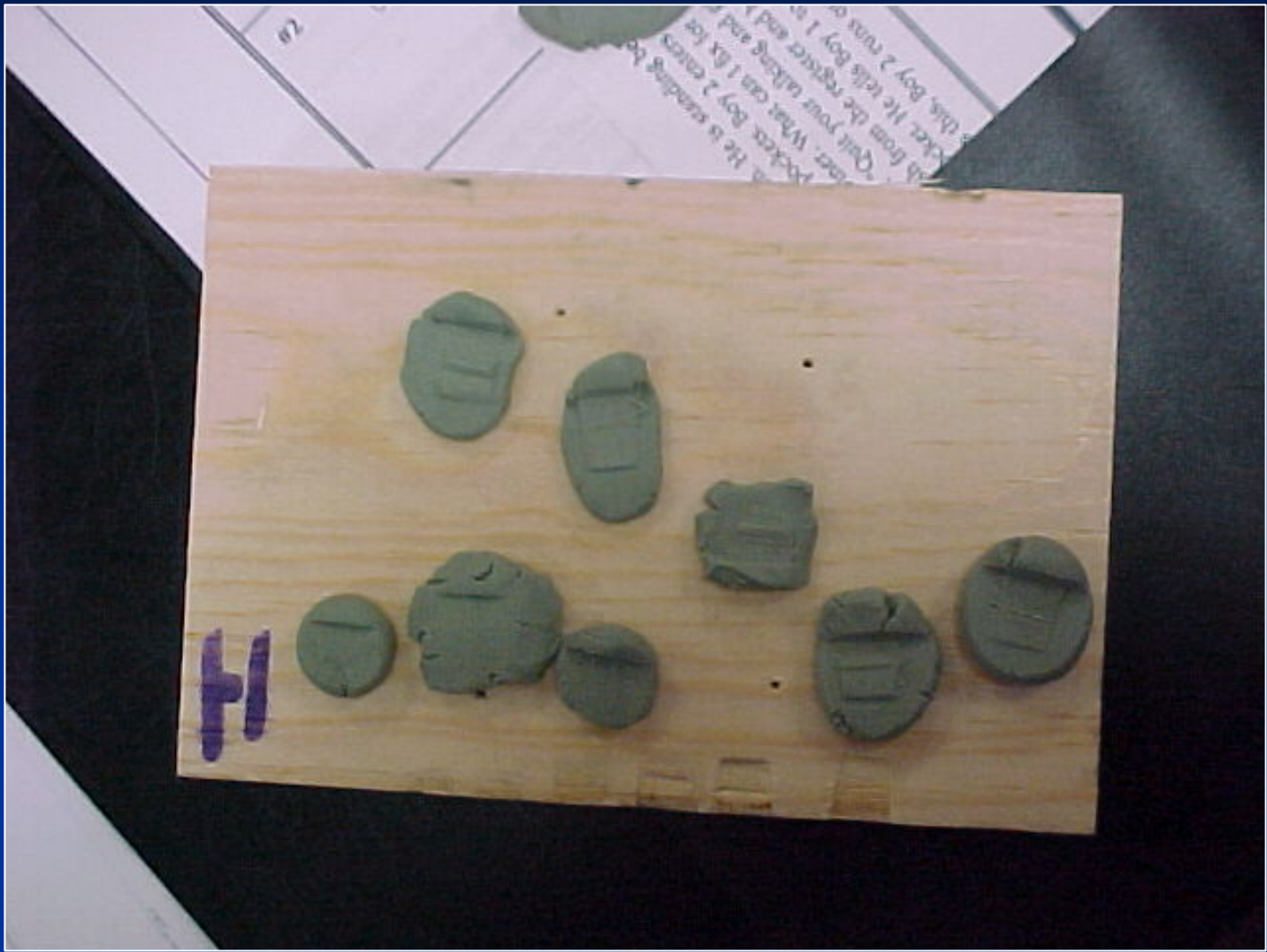












Pondok Laitan
Maret 2014

A



F



B



G



C



H



D



I

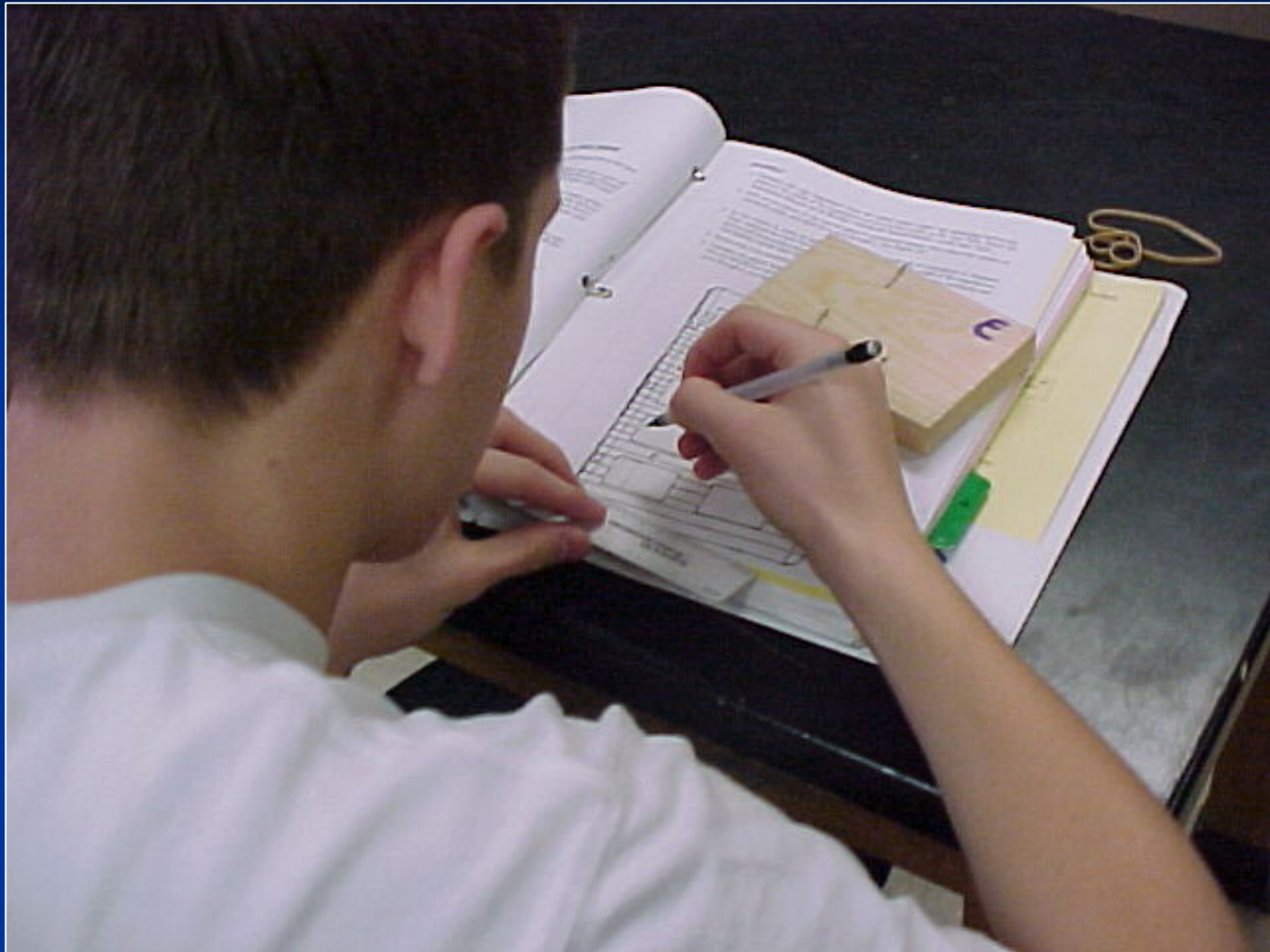


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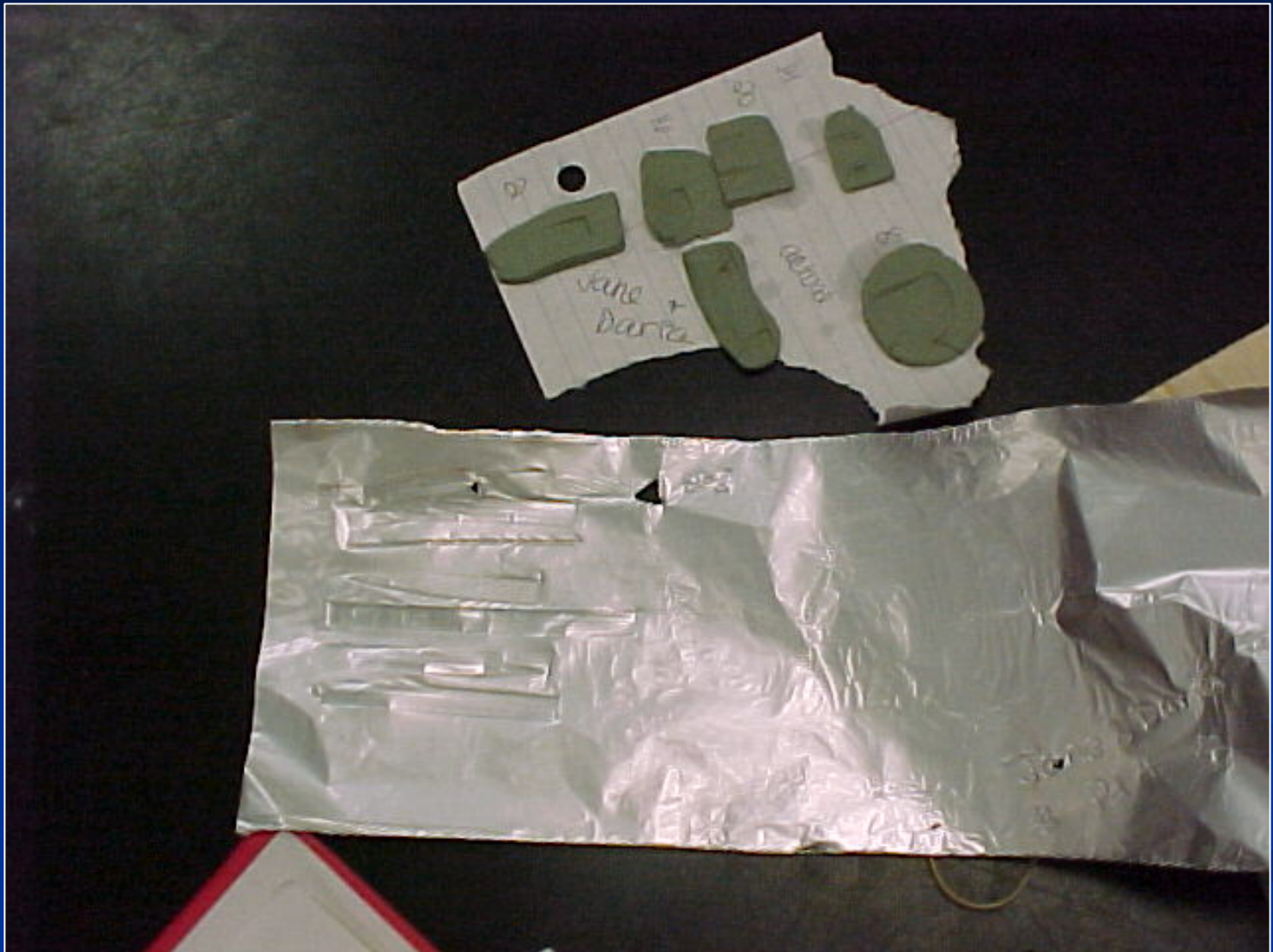


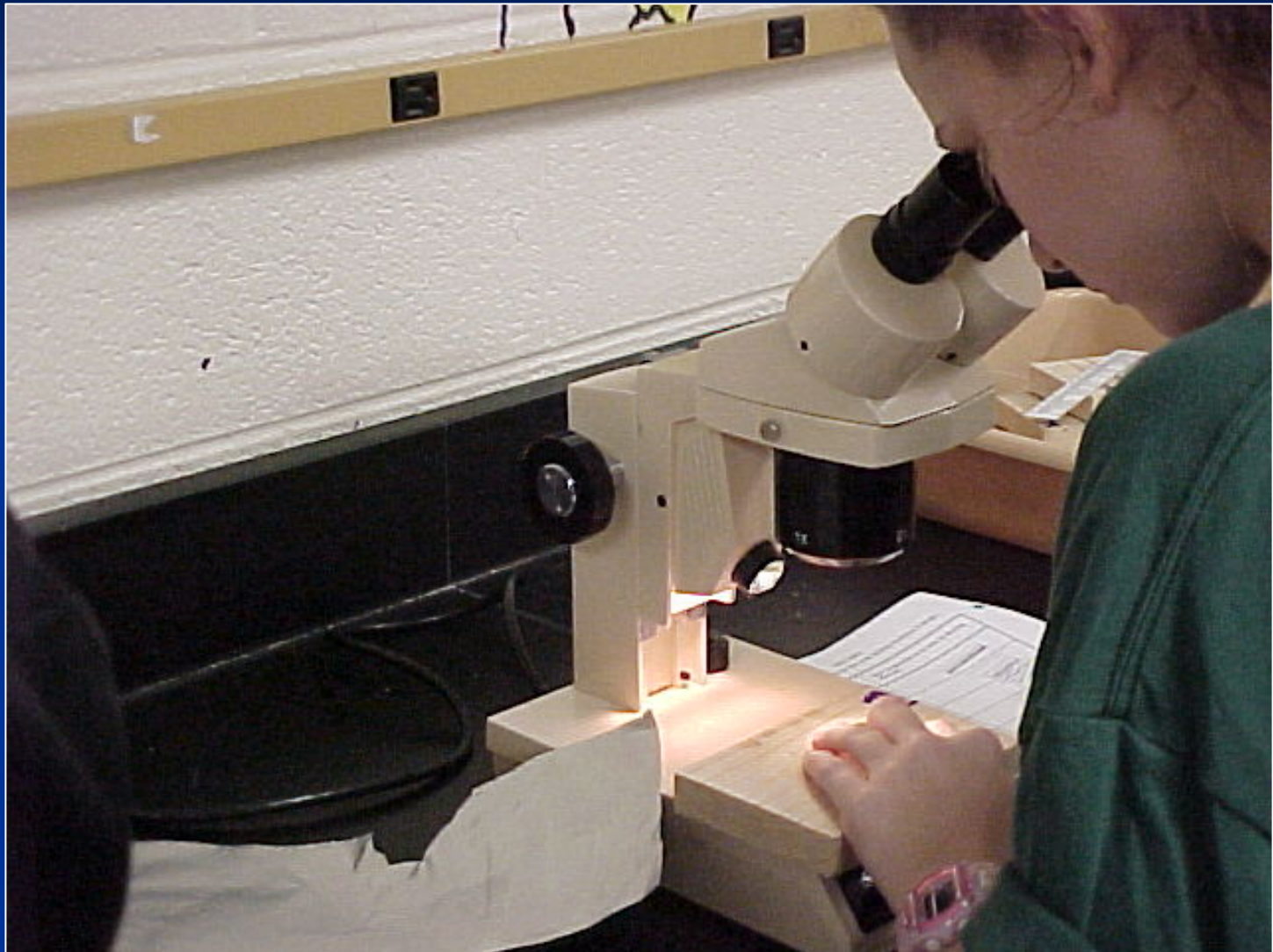
J













Novell-delivered Applications for harriso.Users.Q0125.H5

File Edit View Help

- MCPS_H5
 - a. My Computer
 - b. Applications
 - c. Internet
 - d. Staff Applications
 - e. Windows Accessories
 - Change Resolution
 - f. Department Related
 - Science**
 - i. Media Center
 - l. Control Panel
 - m. Updates
 - n. Shutdown



Chemventory



DNA



ProScope -
USB Shot

for harriso.Users.Q0125.H5



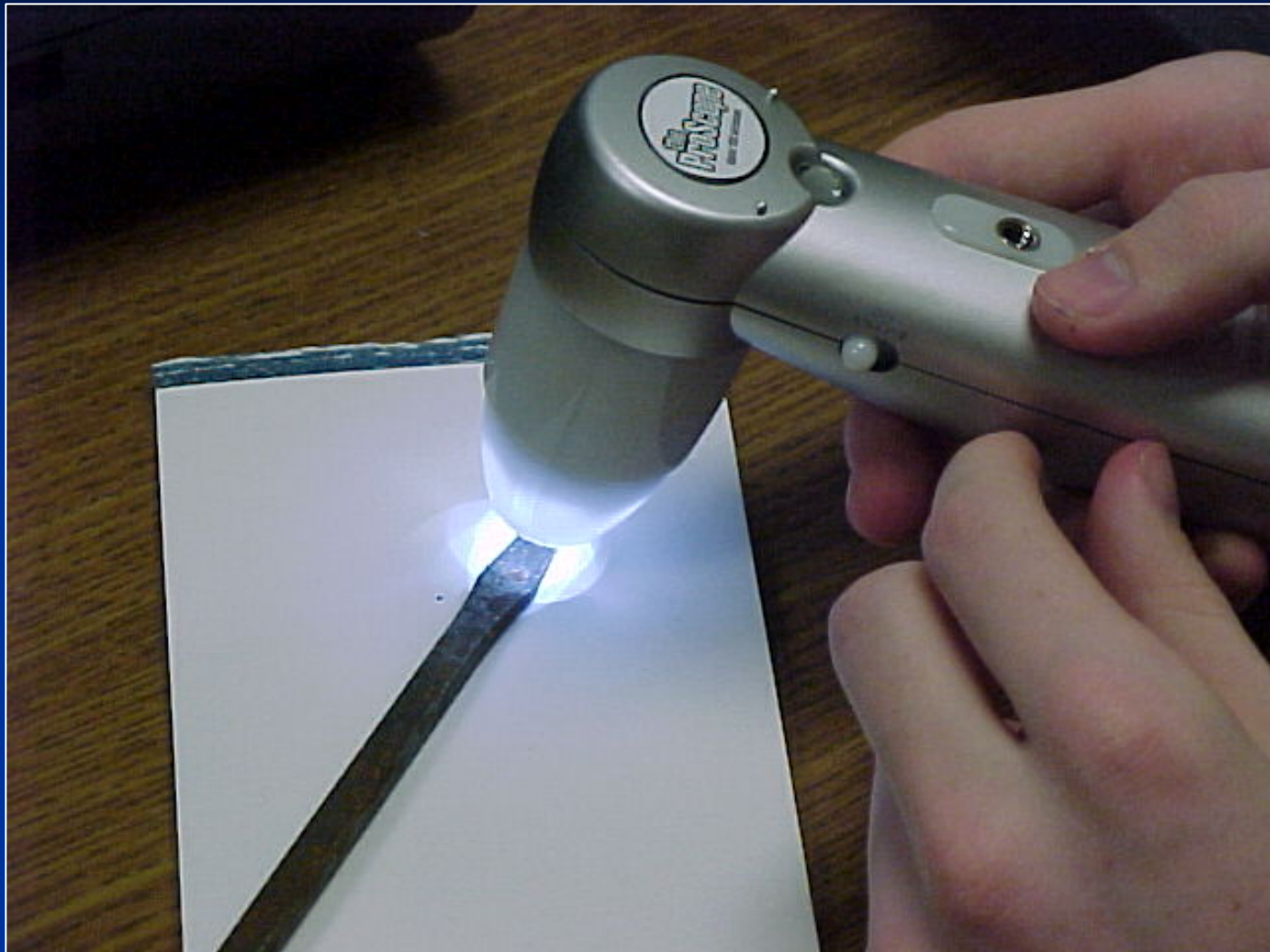
Chemventory



DNA



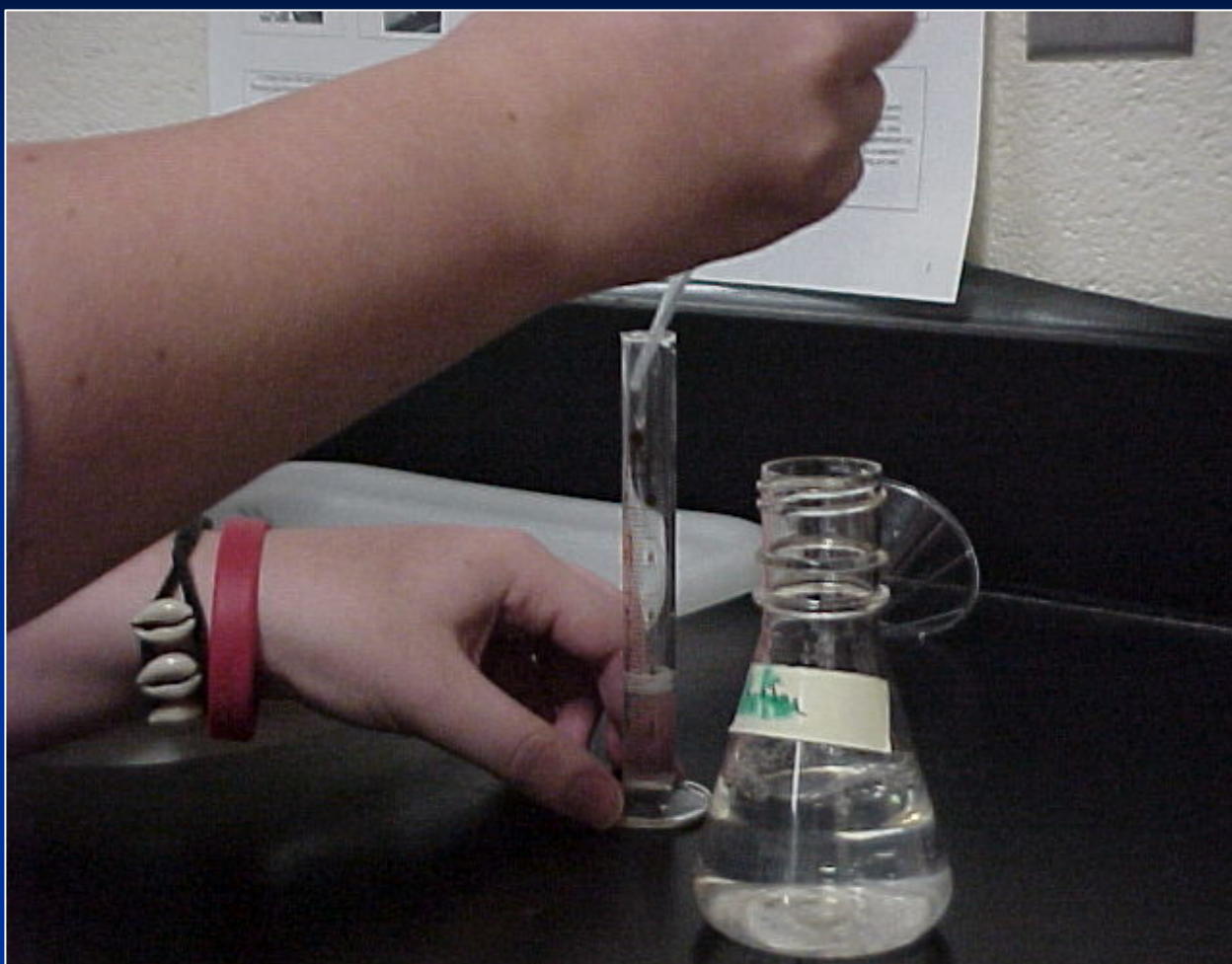
ProScope -
USB Shot





DNA Recovery

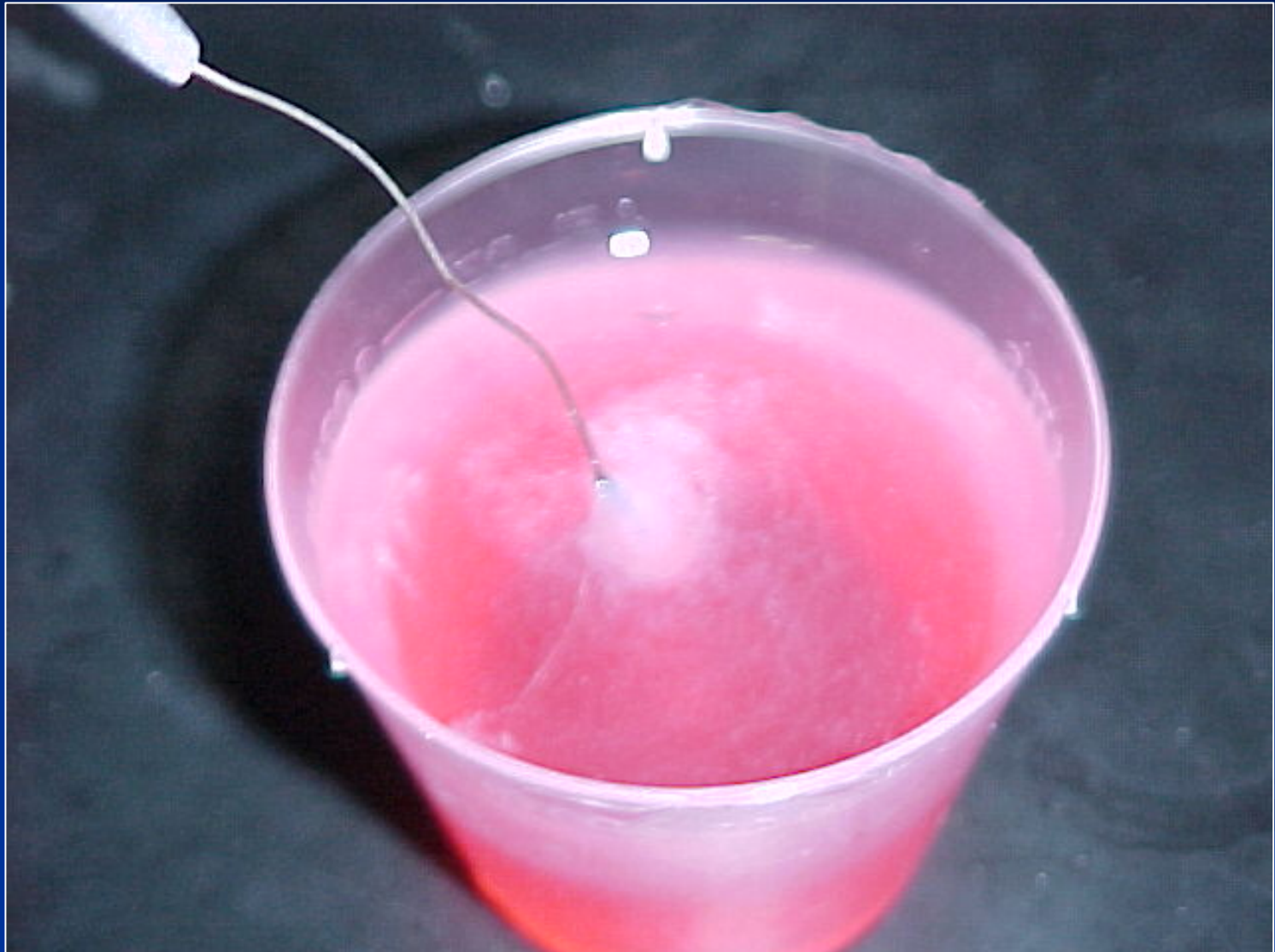


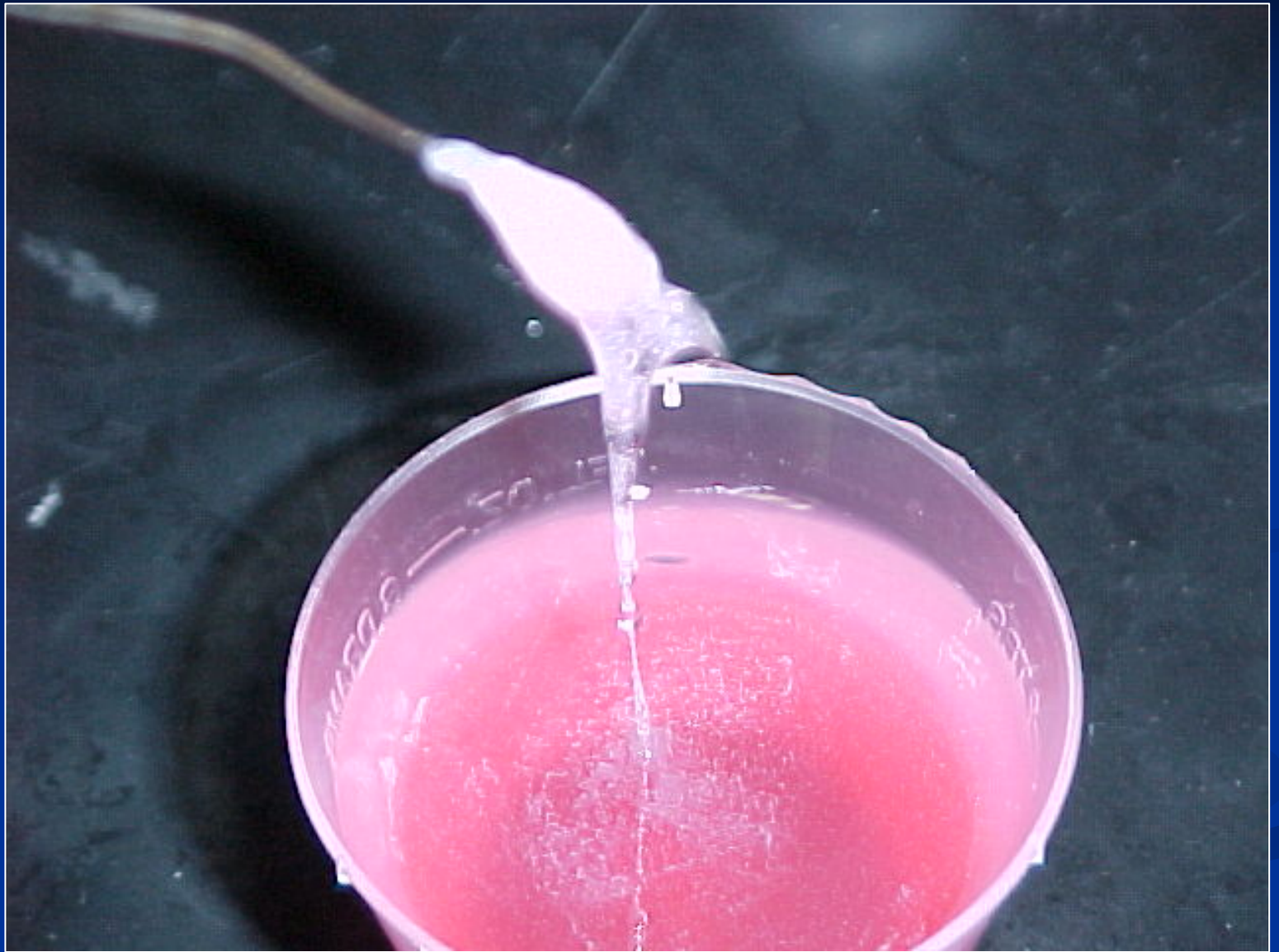














On-Line Activities

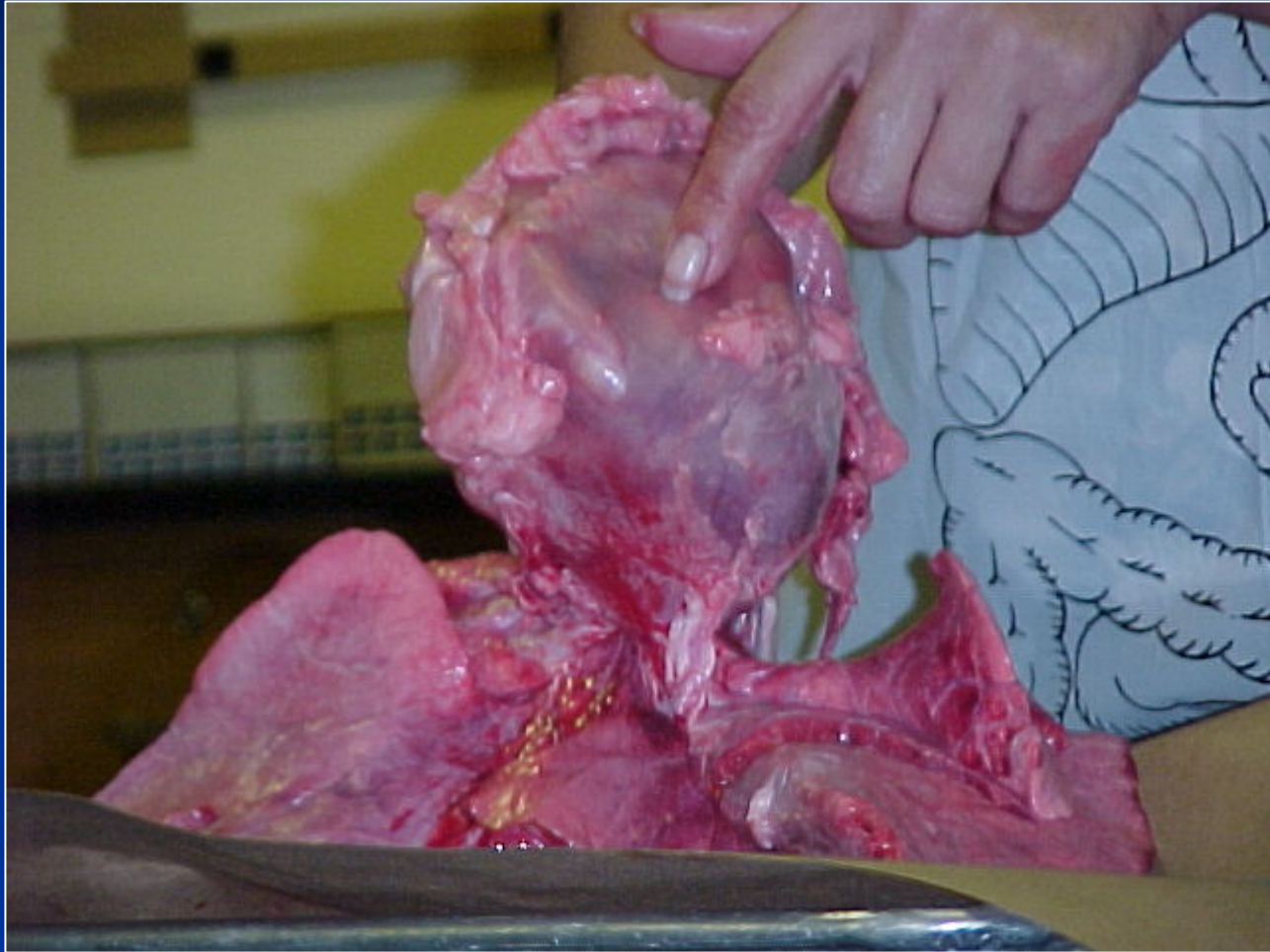




Blood and Blood Spatter

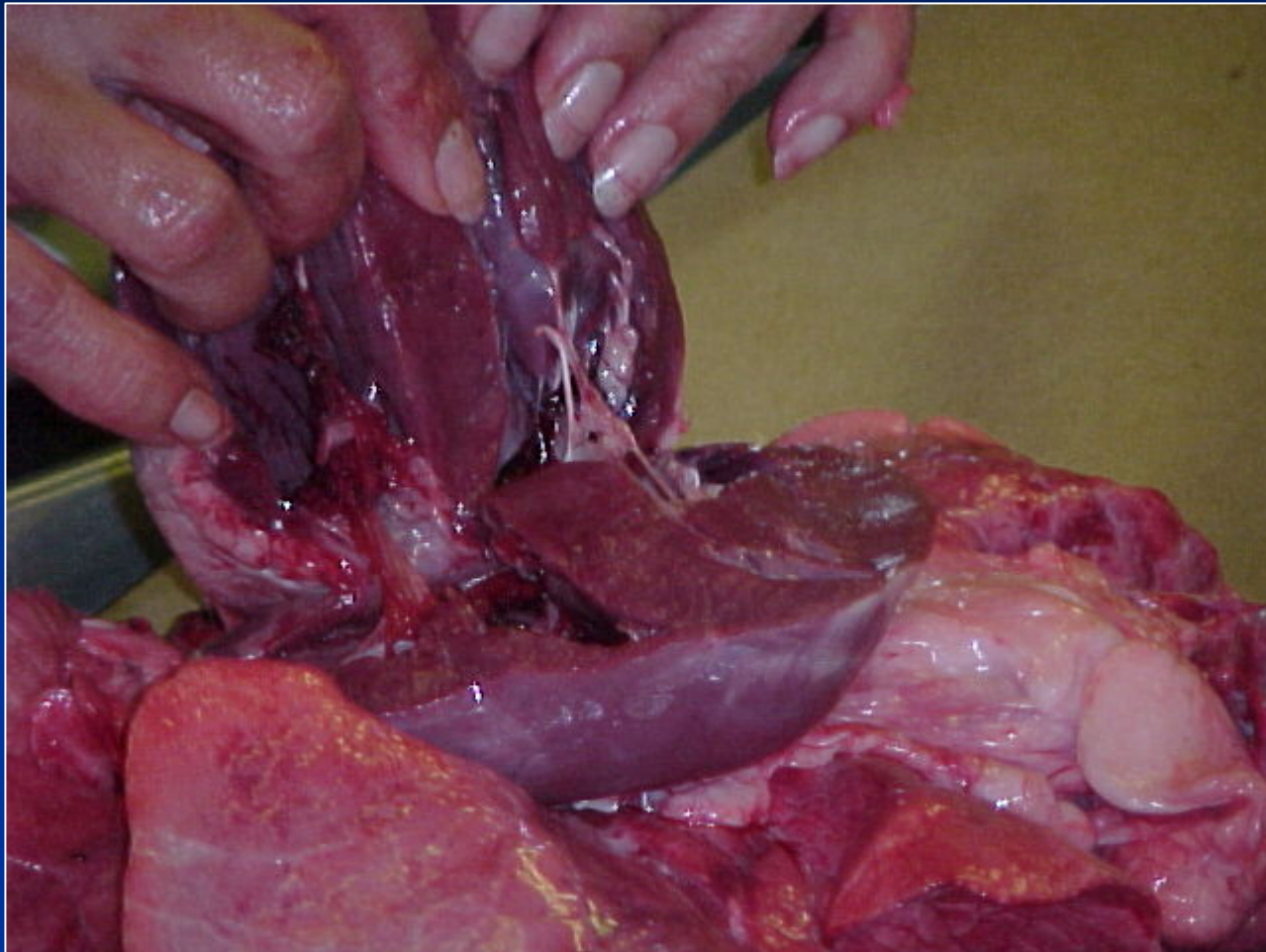




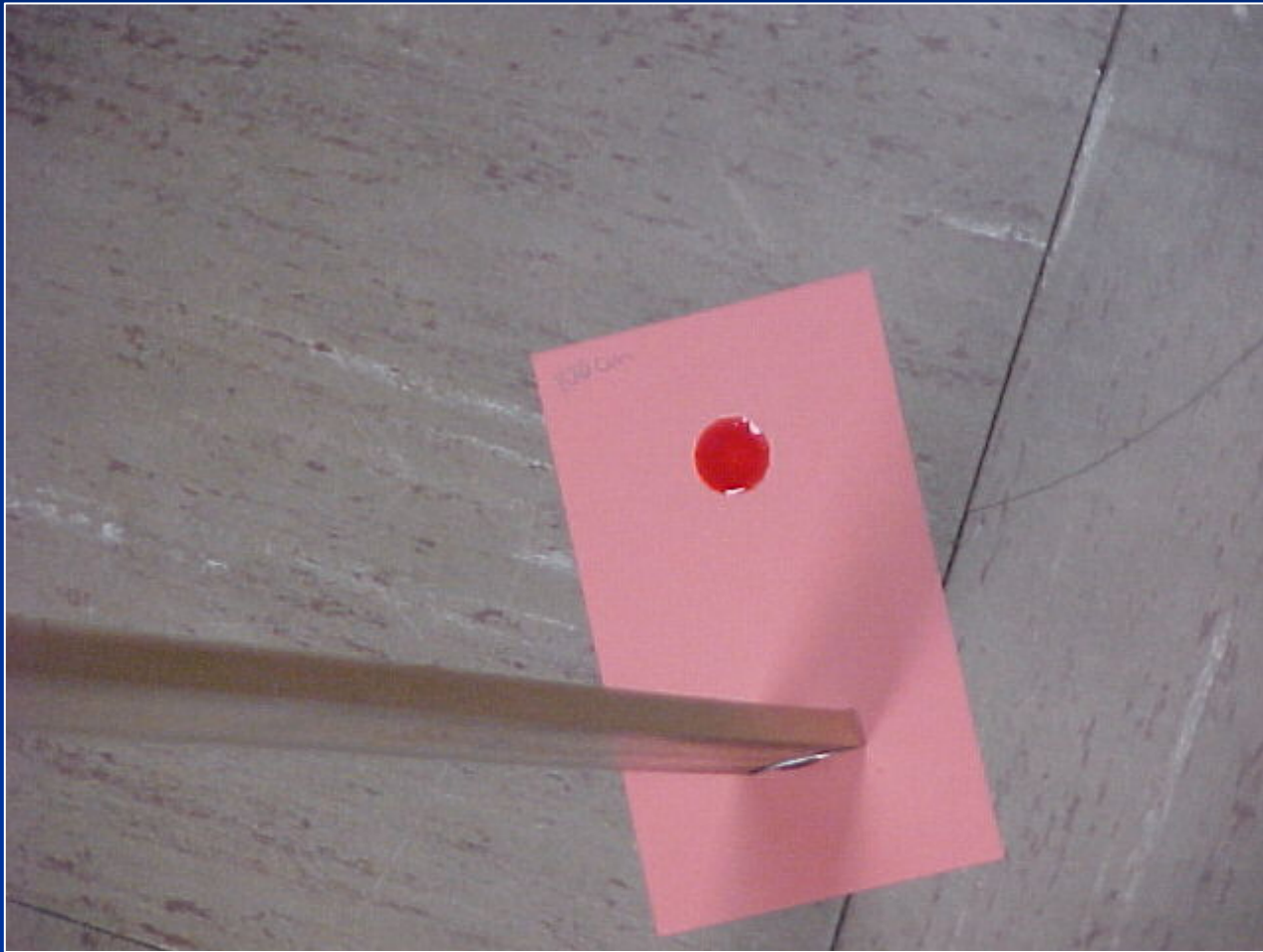


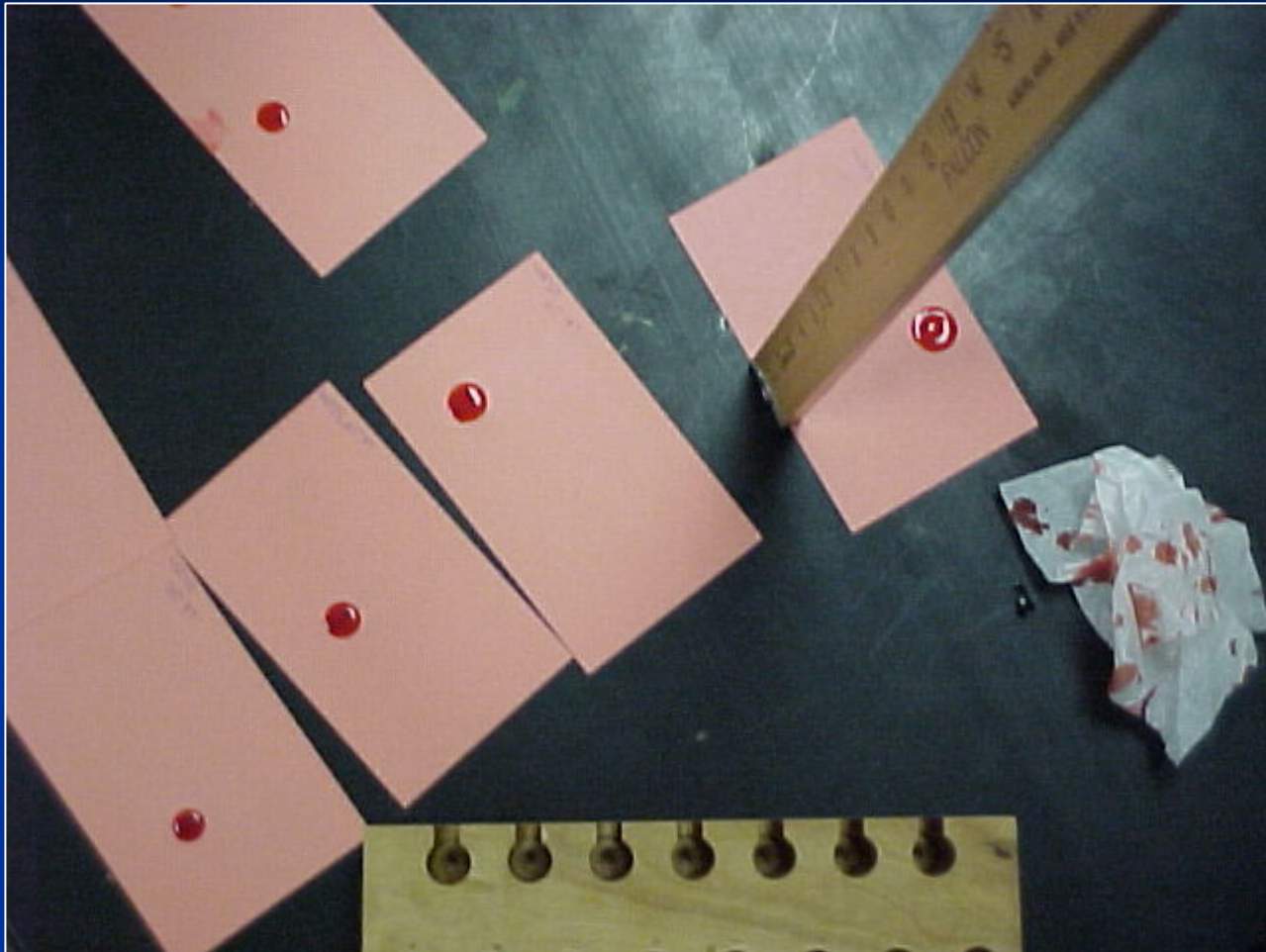


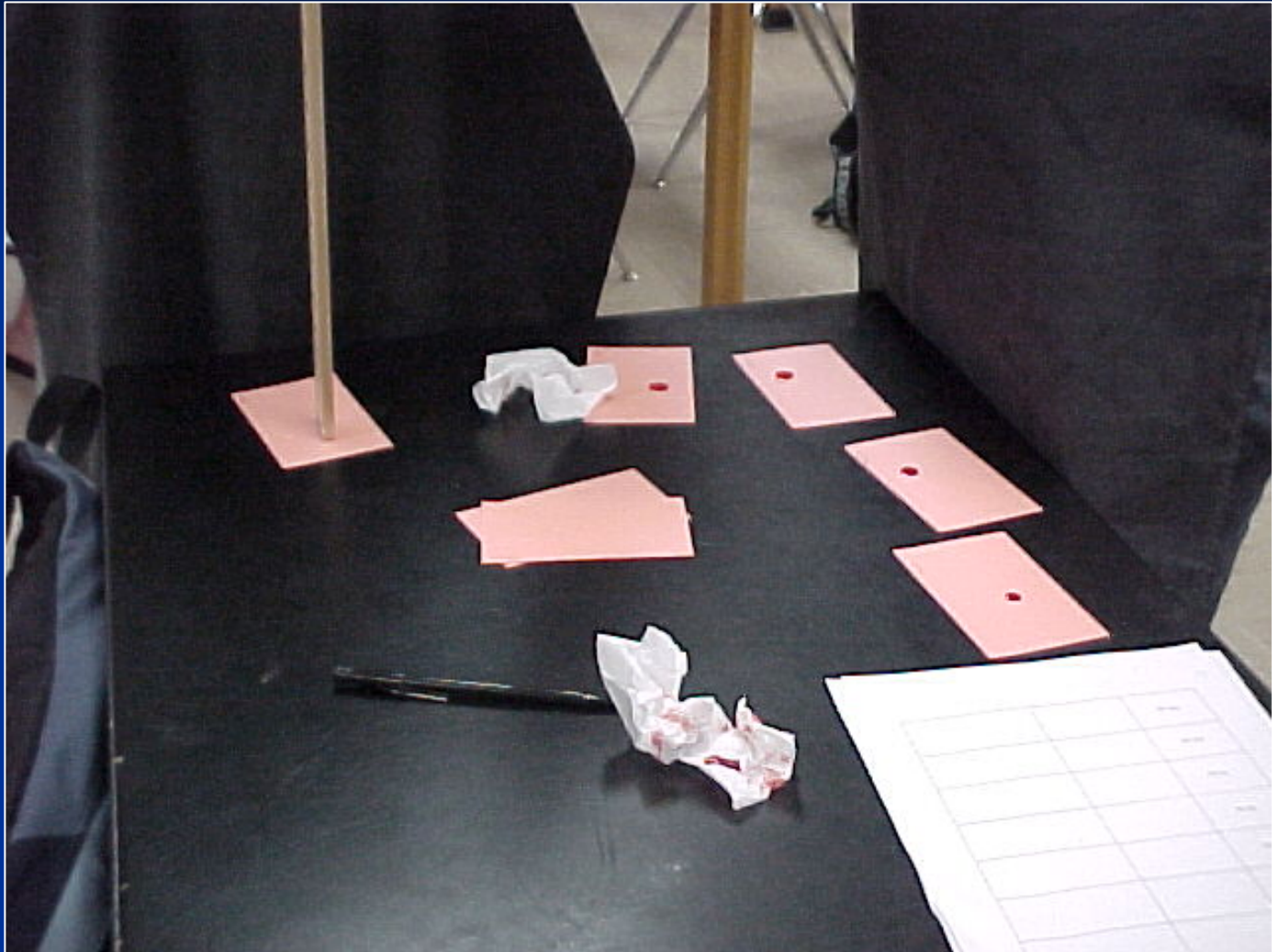


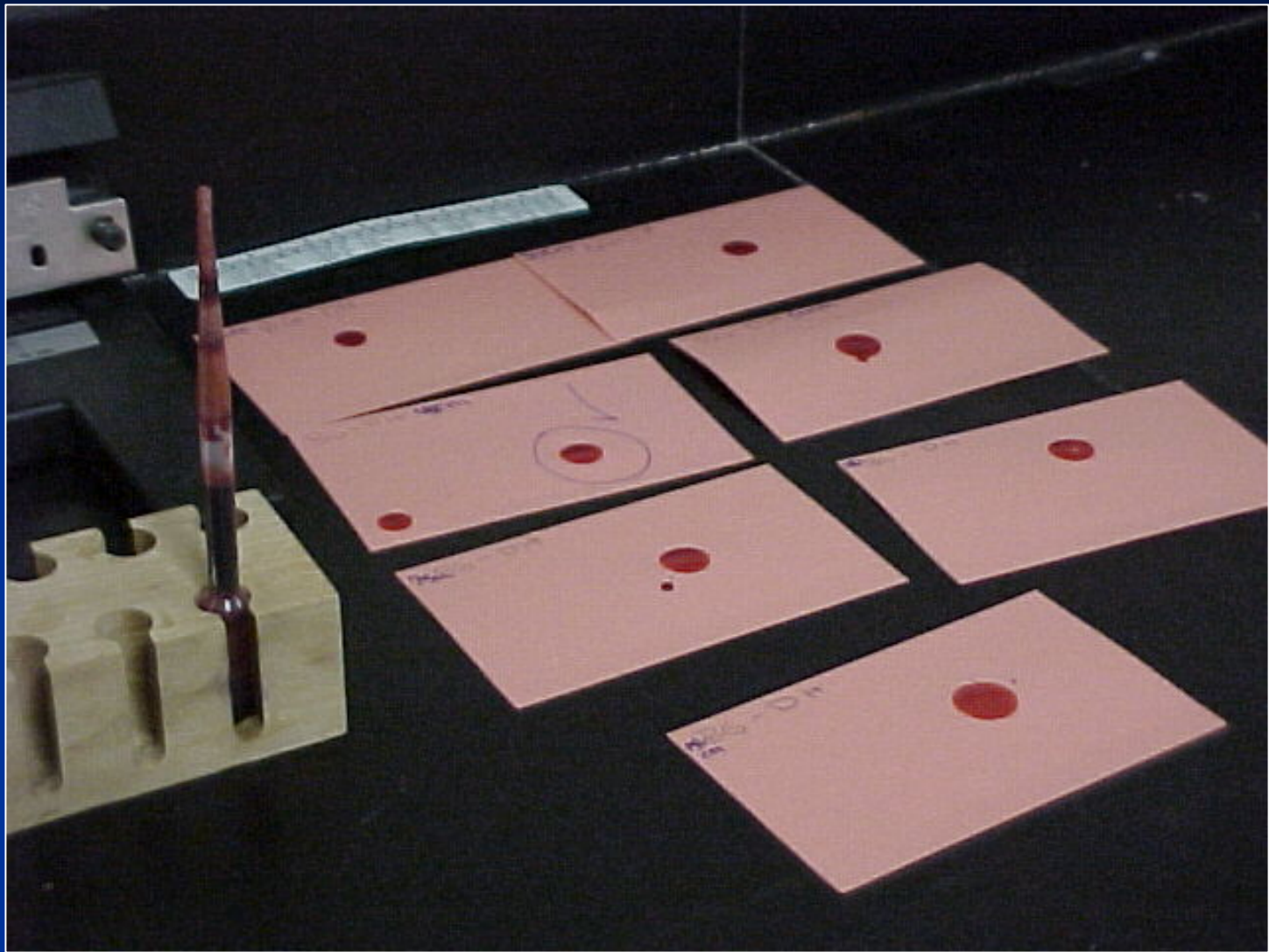


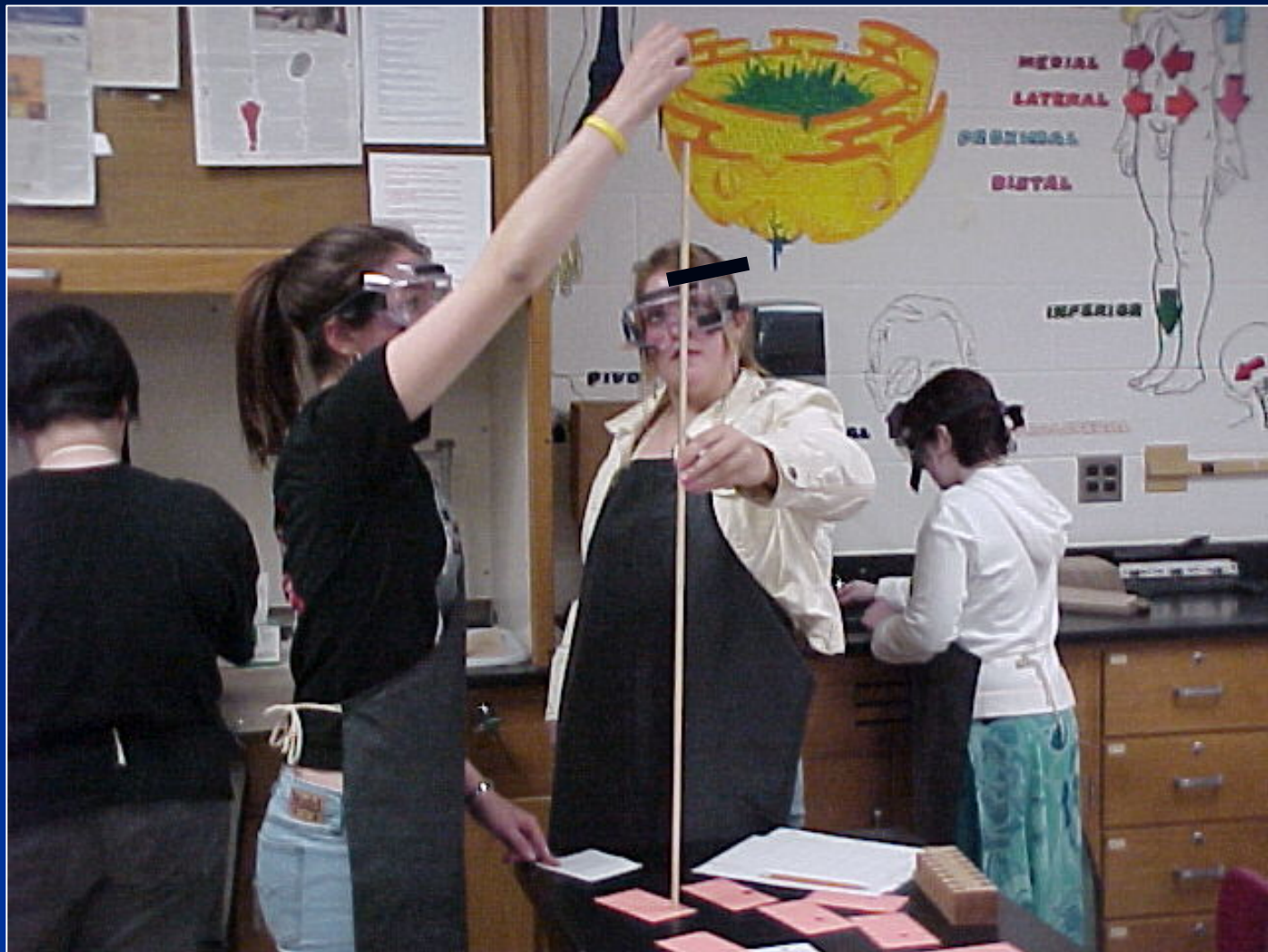
Simulated Blood



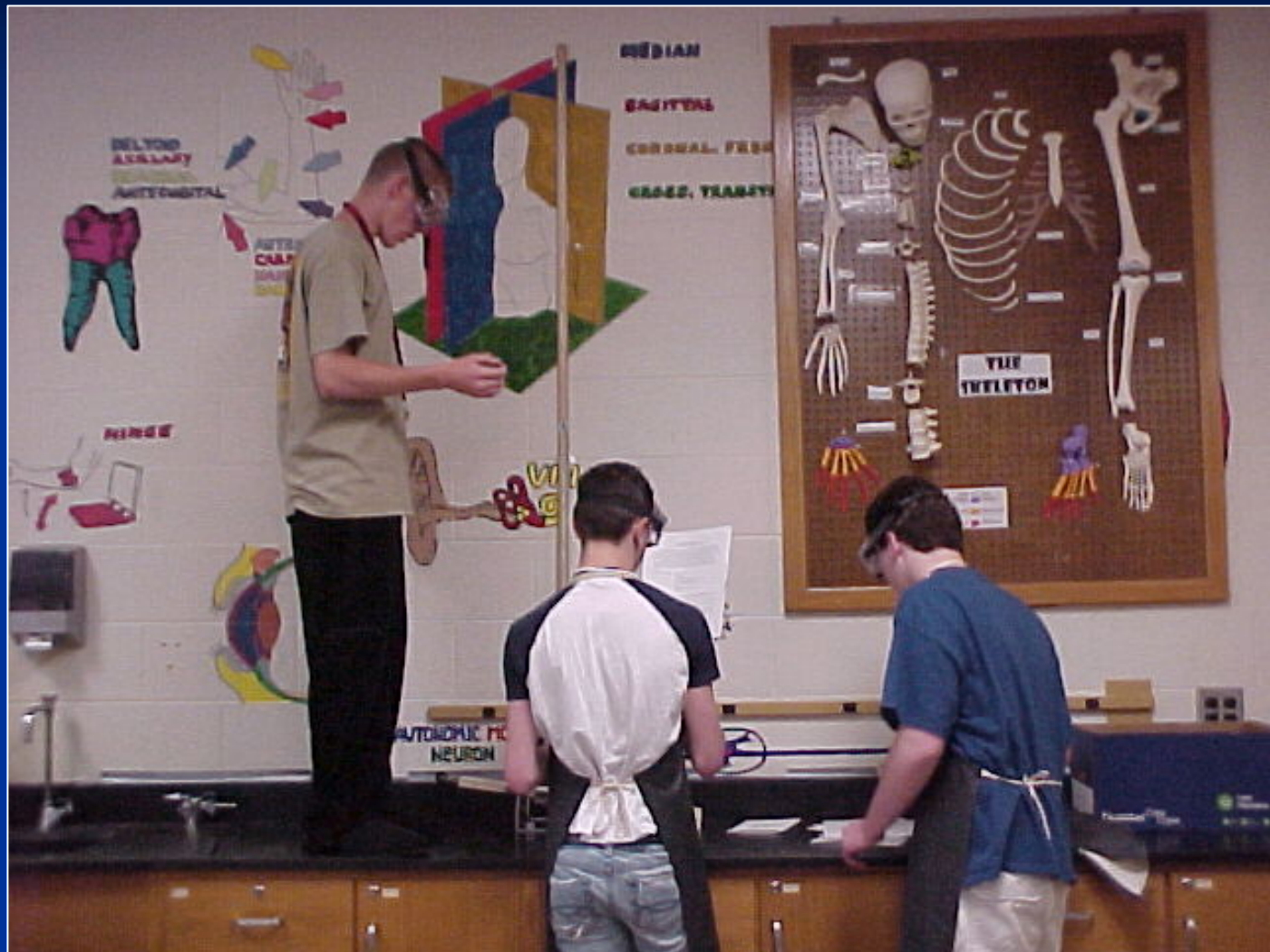








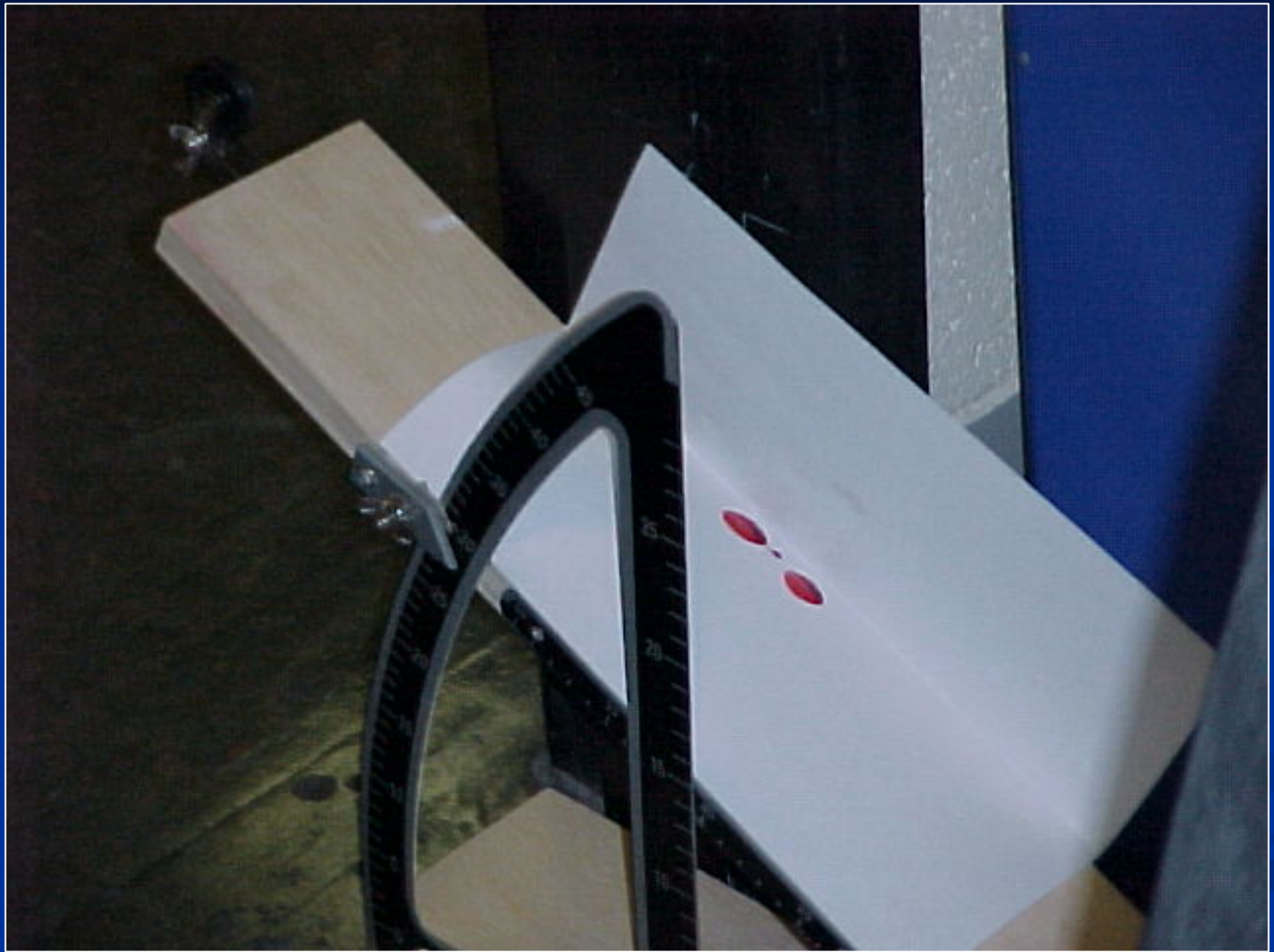


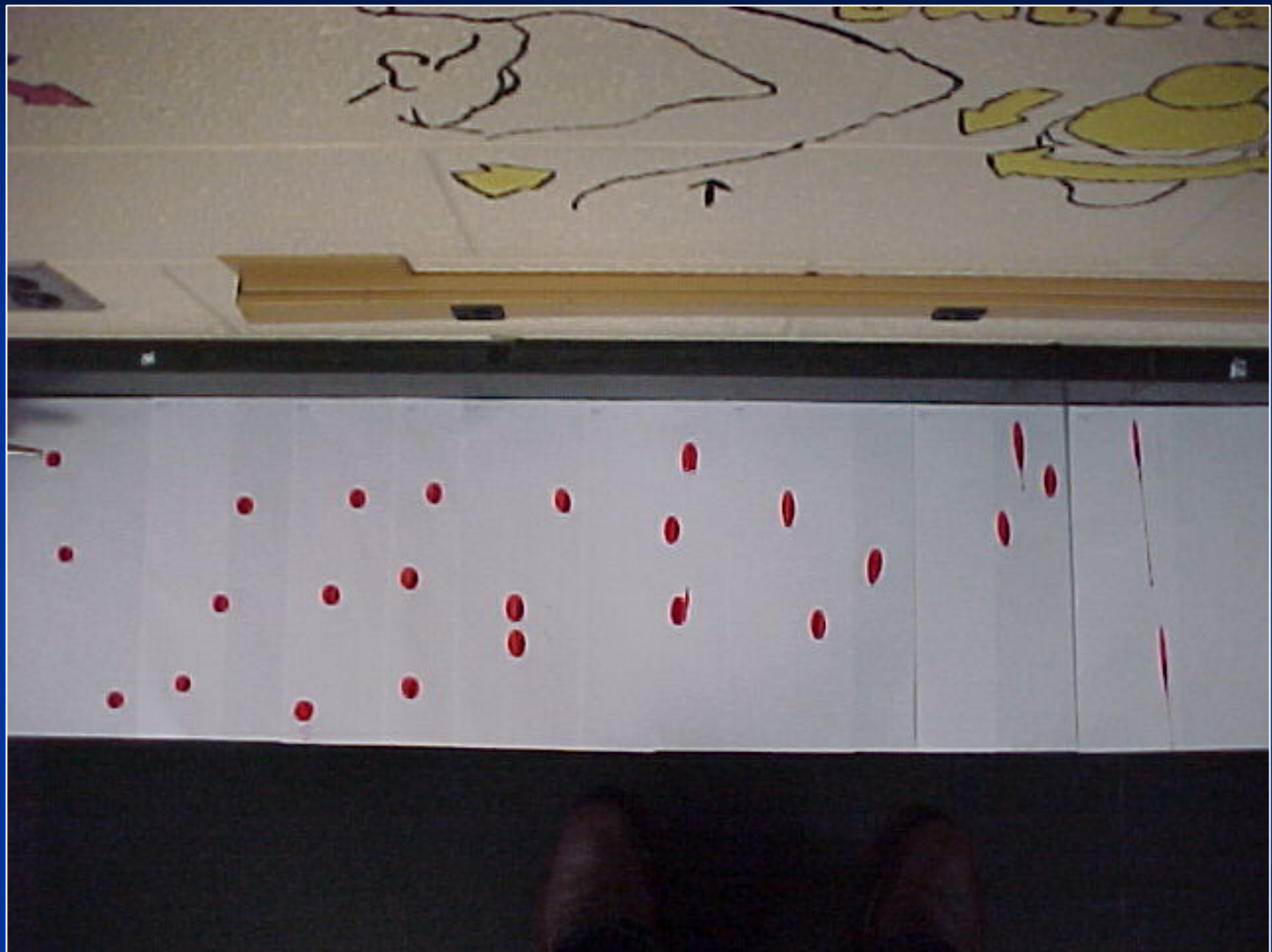




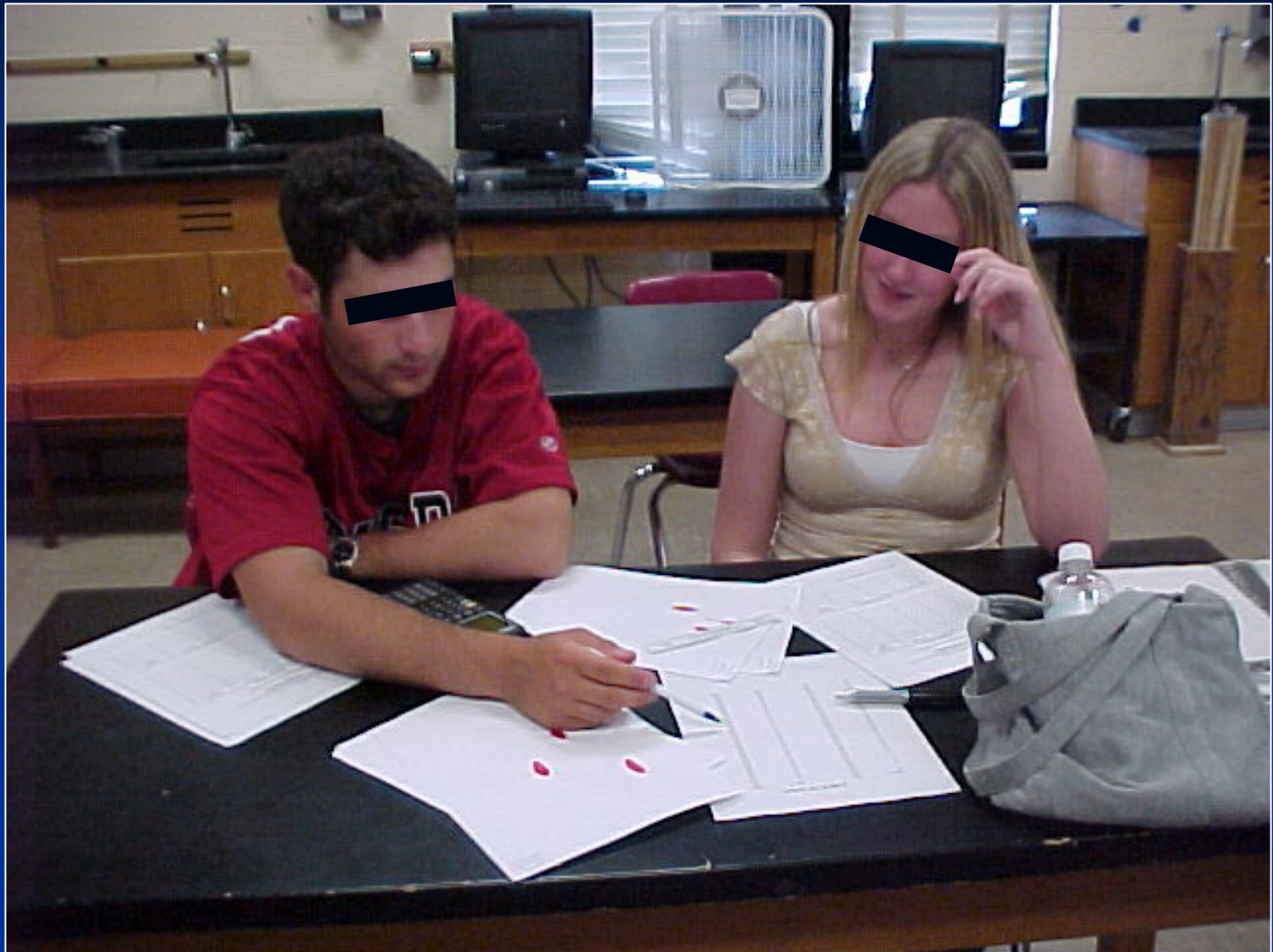


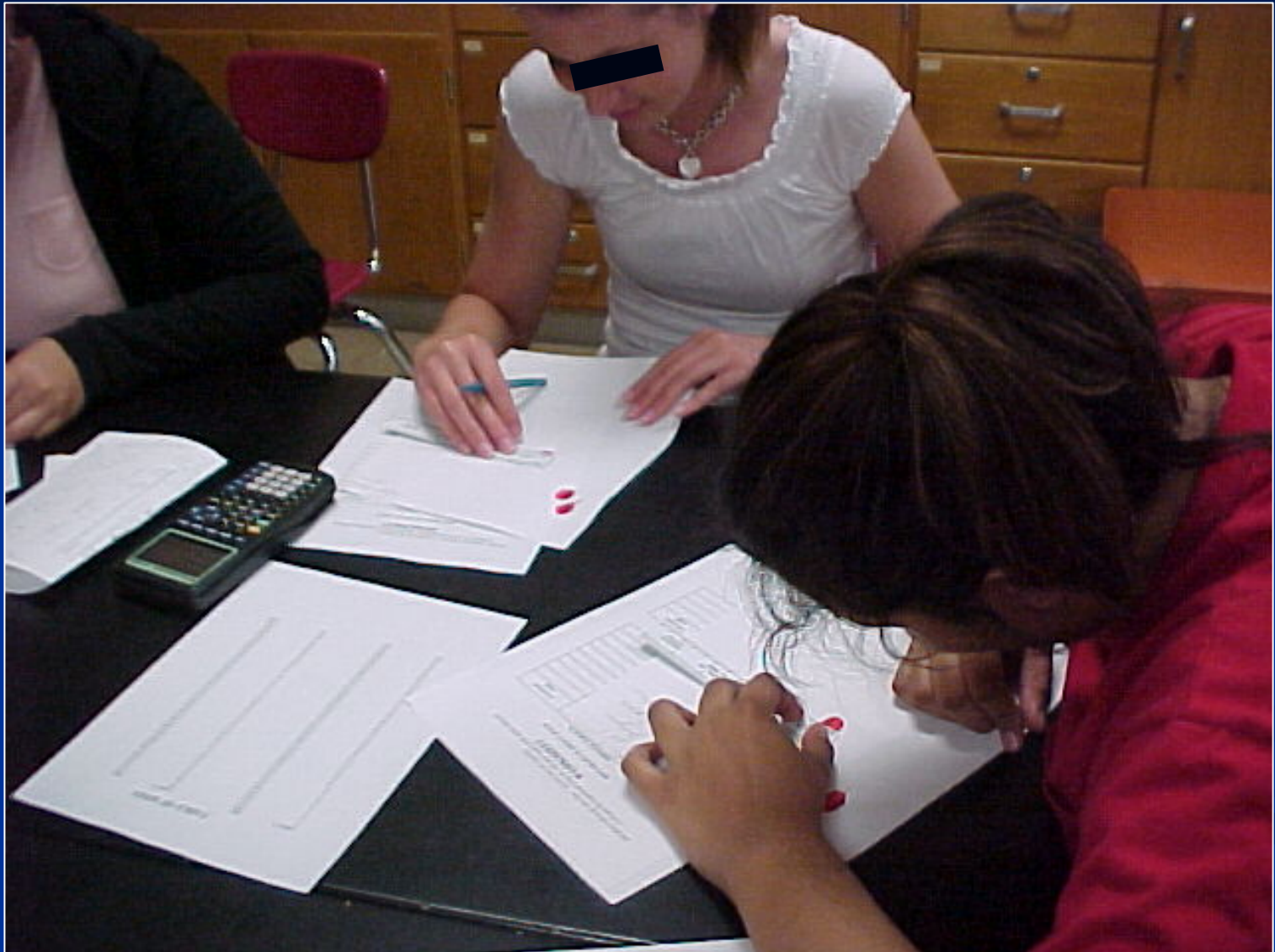


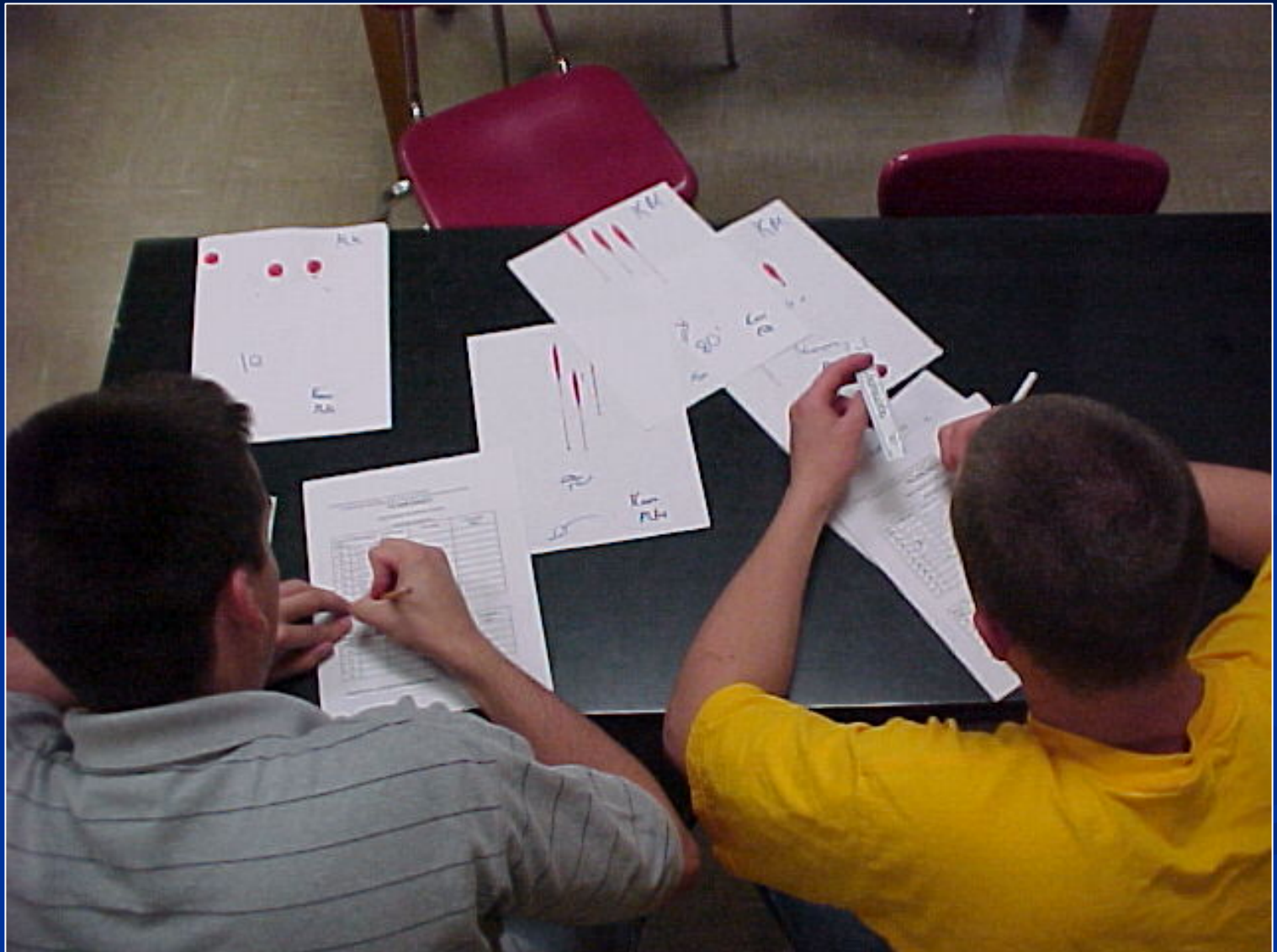








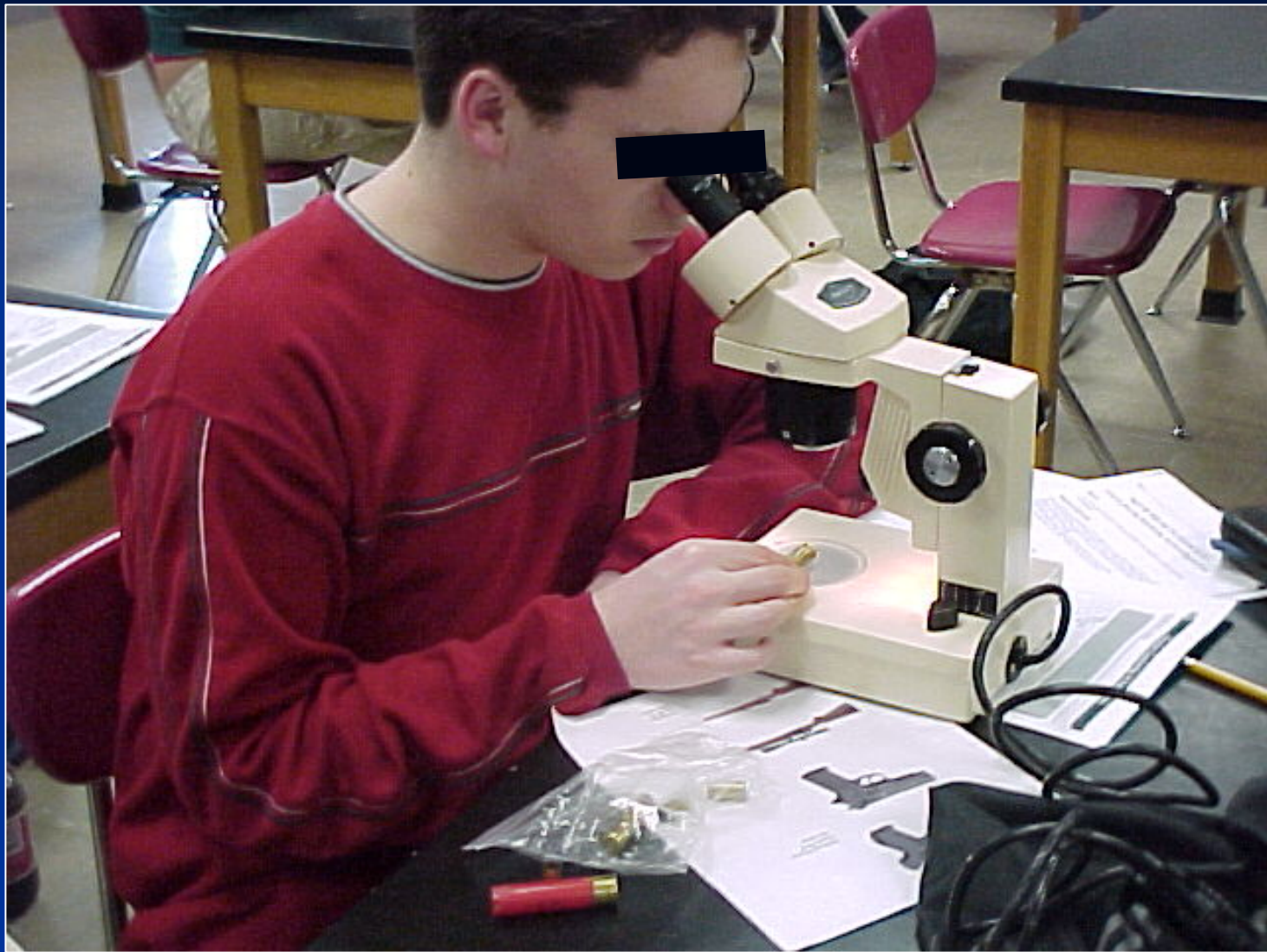


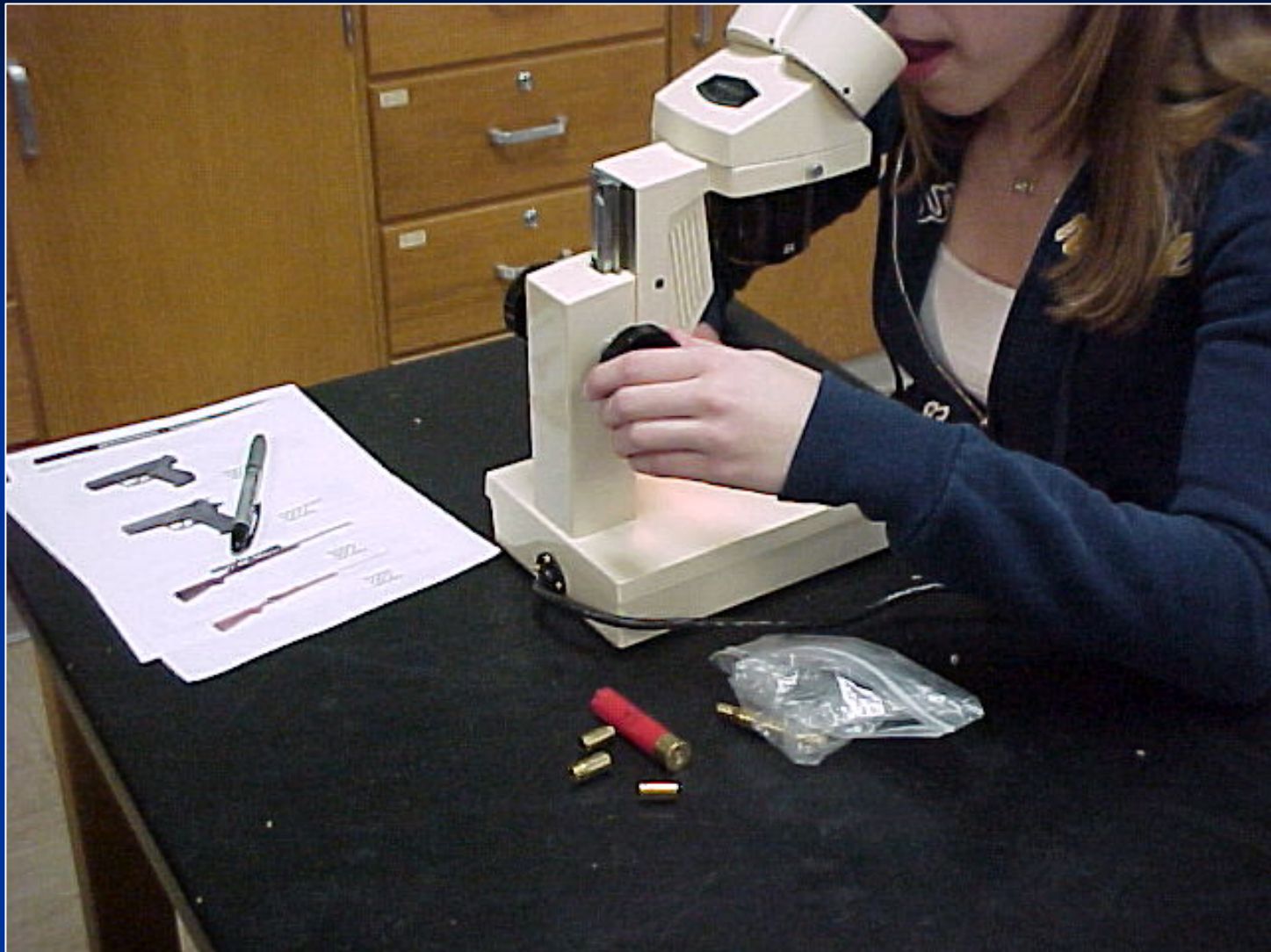


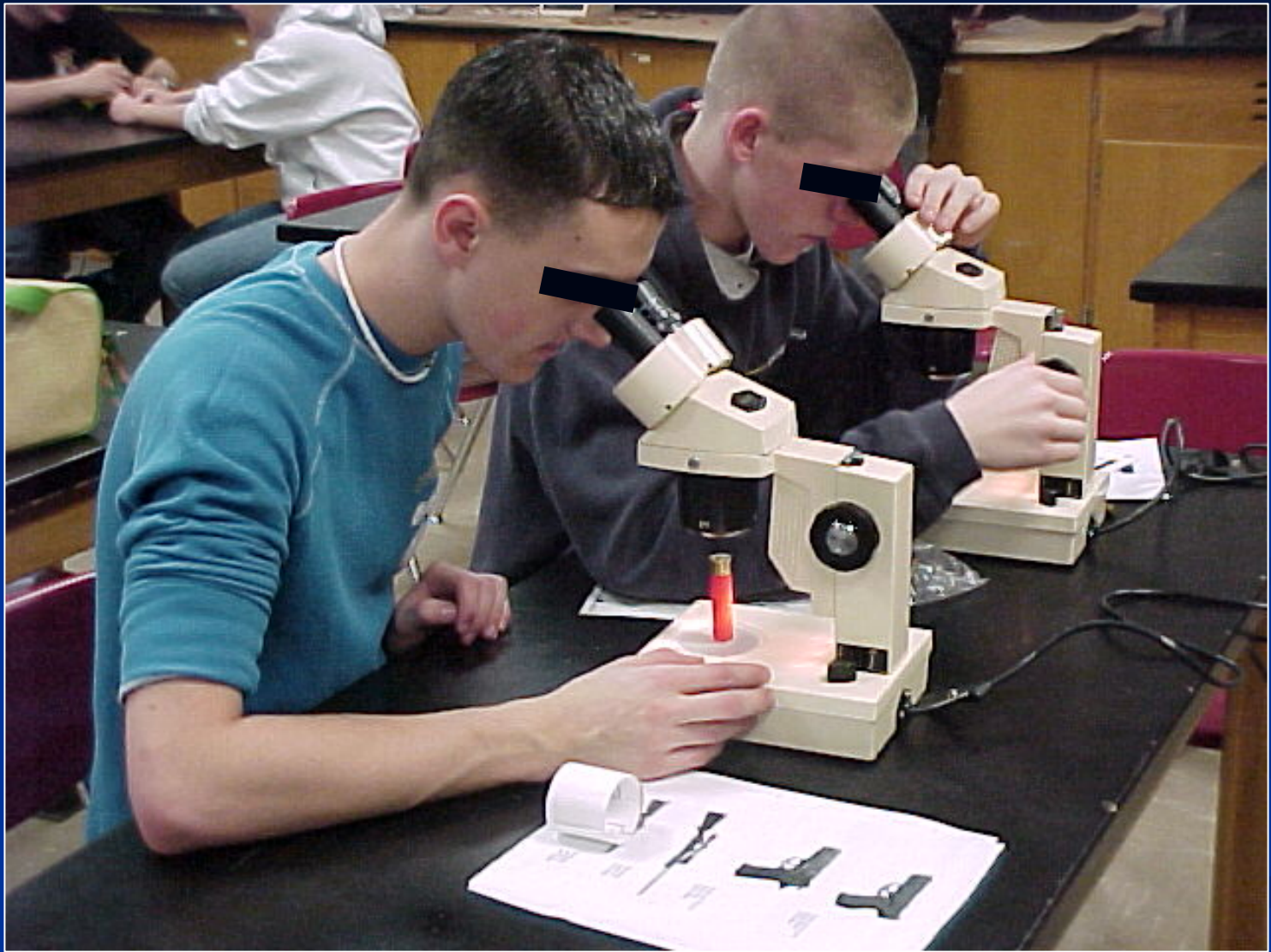


Firearms

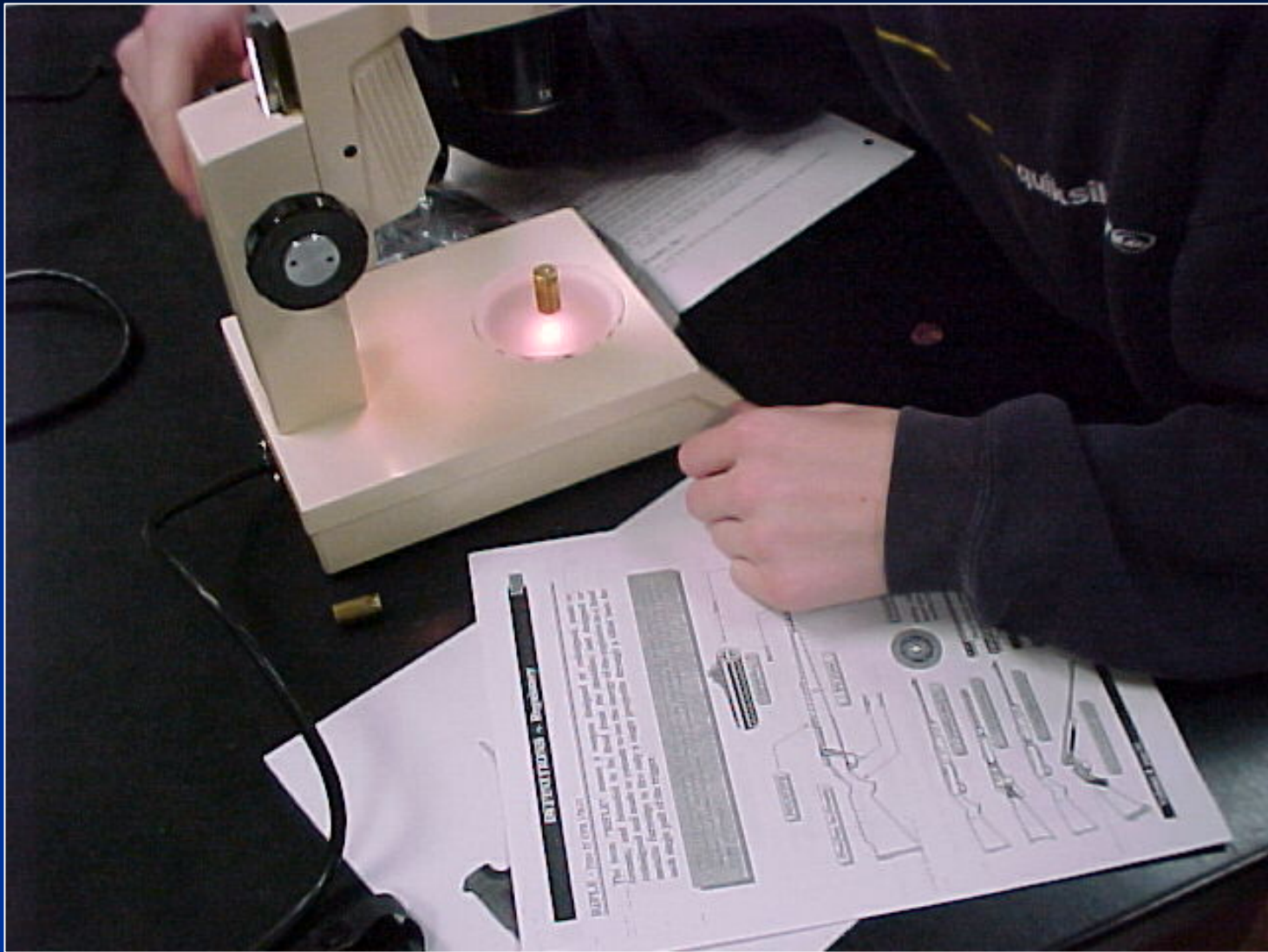












Arson





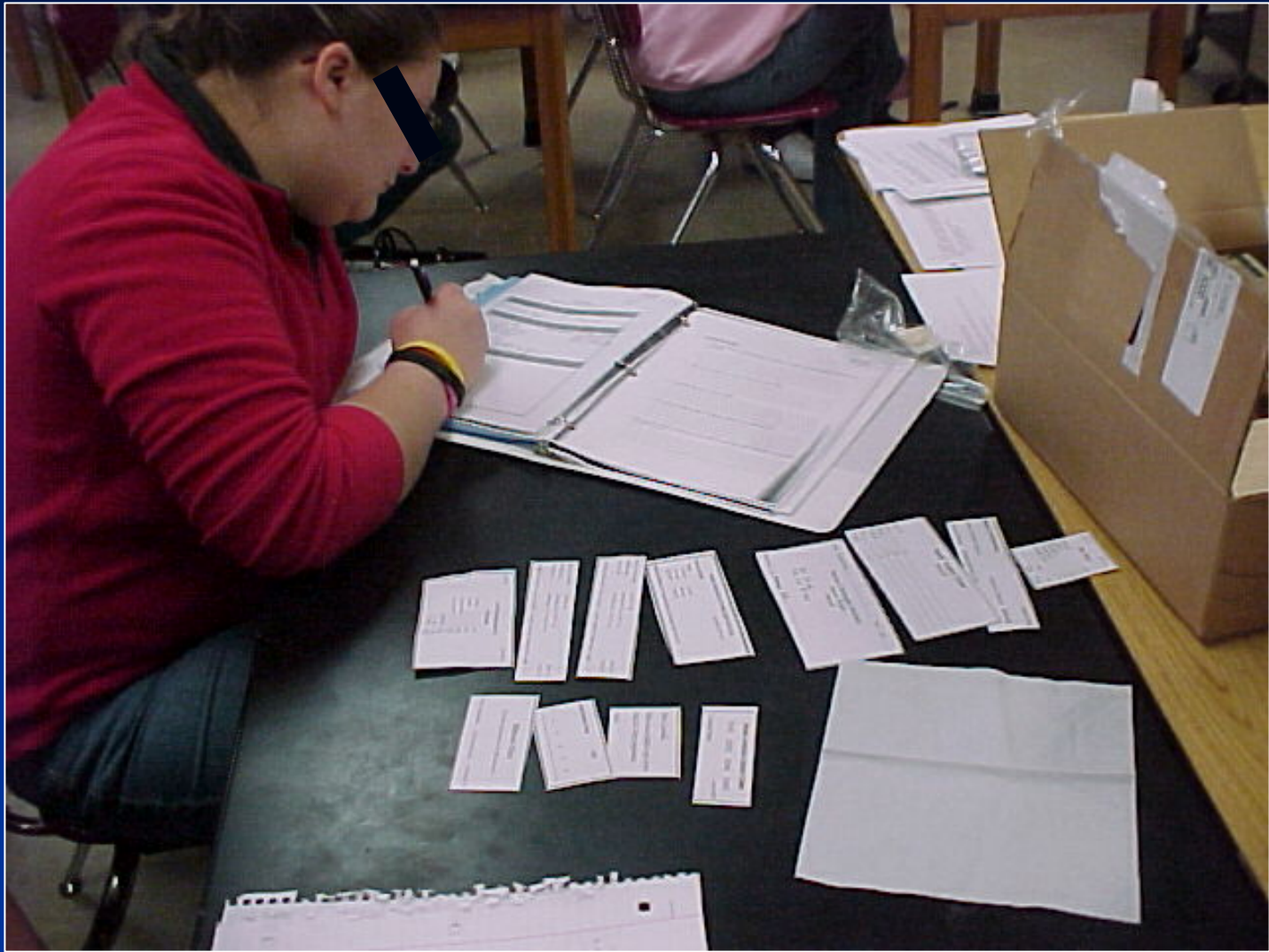


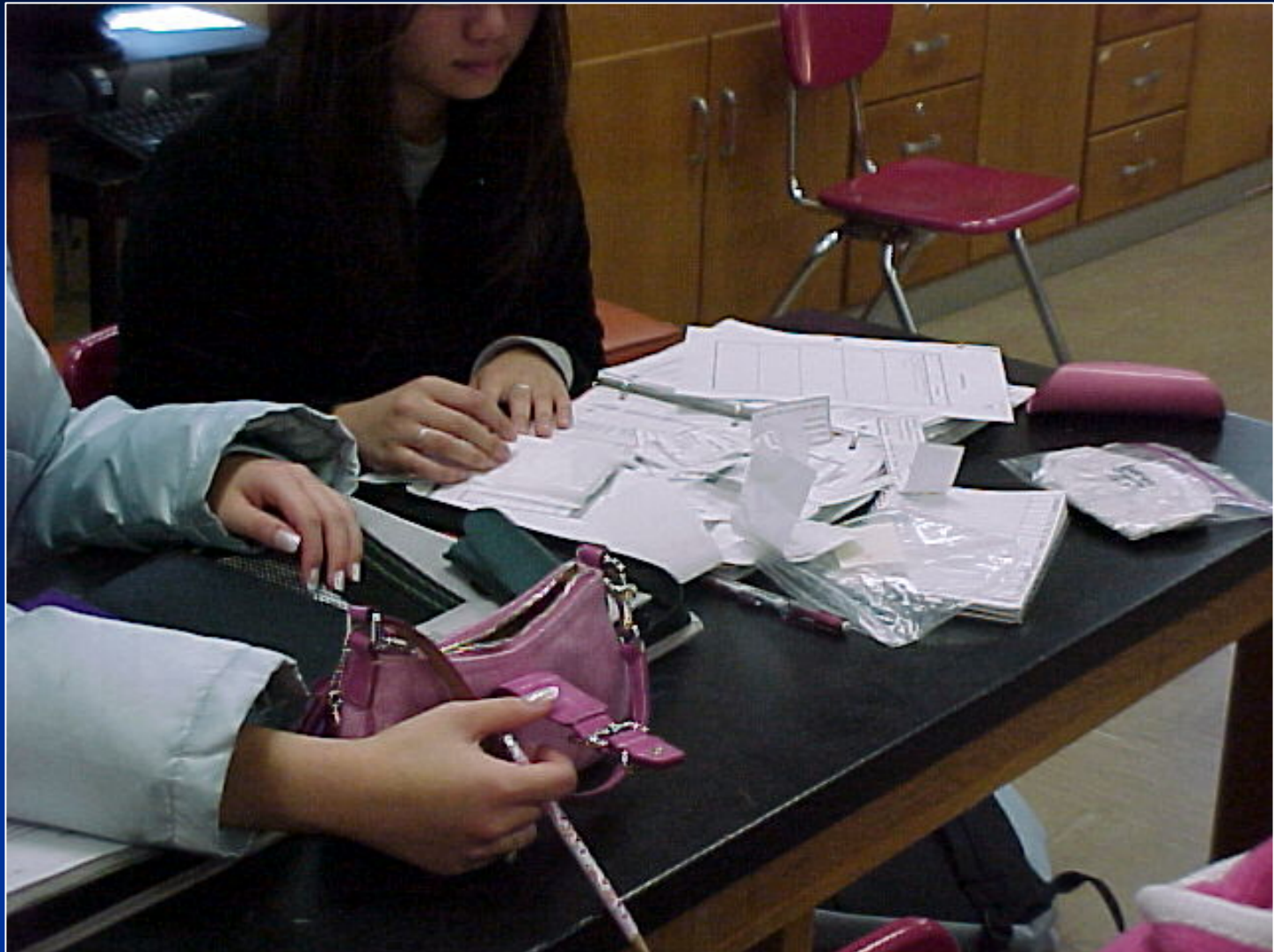


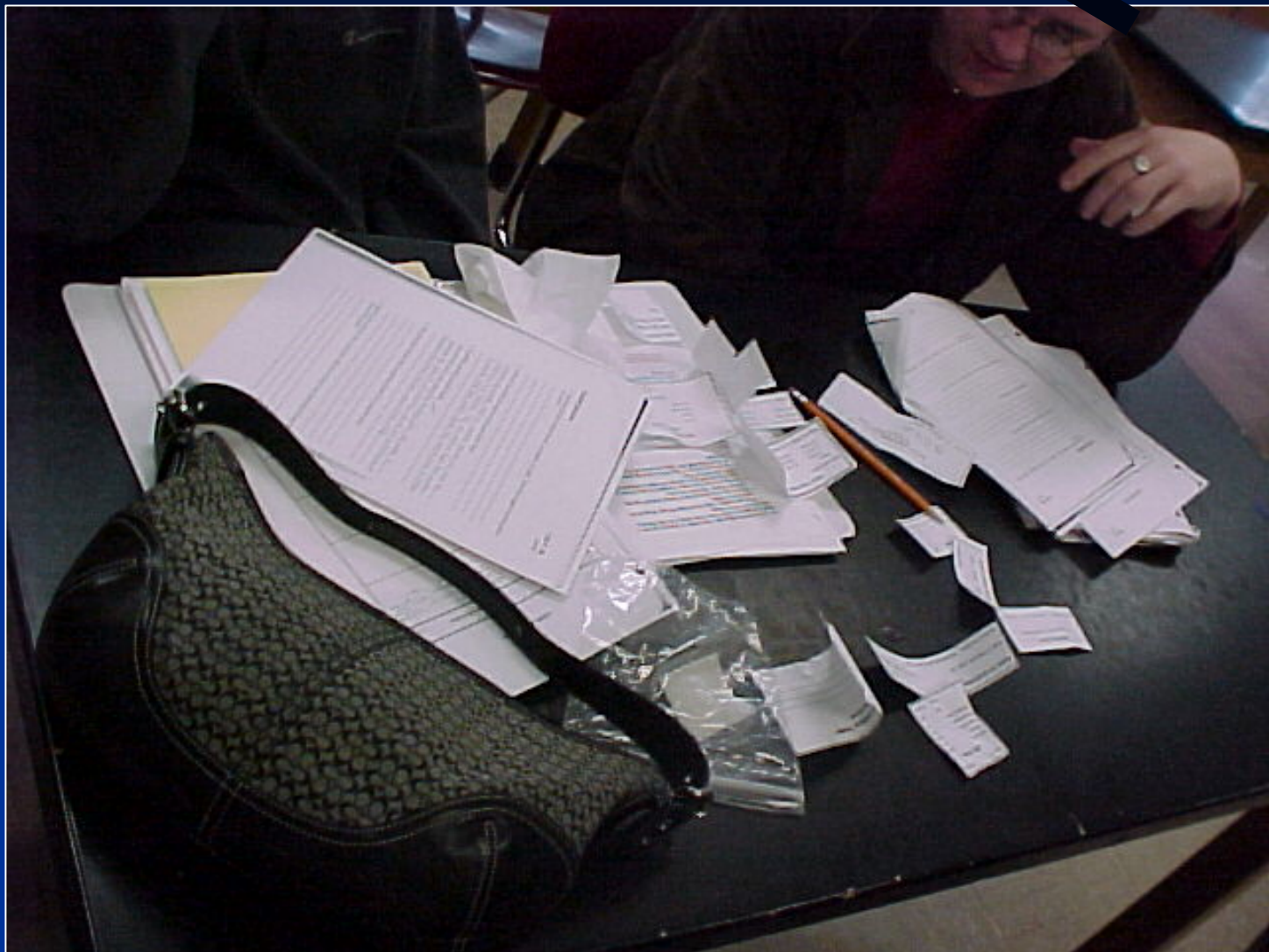


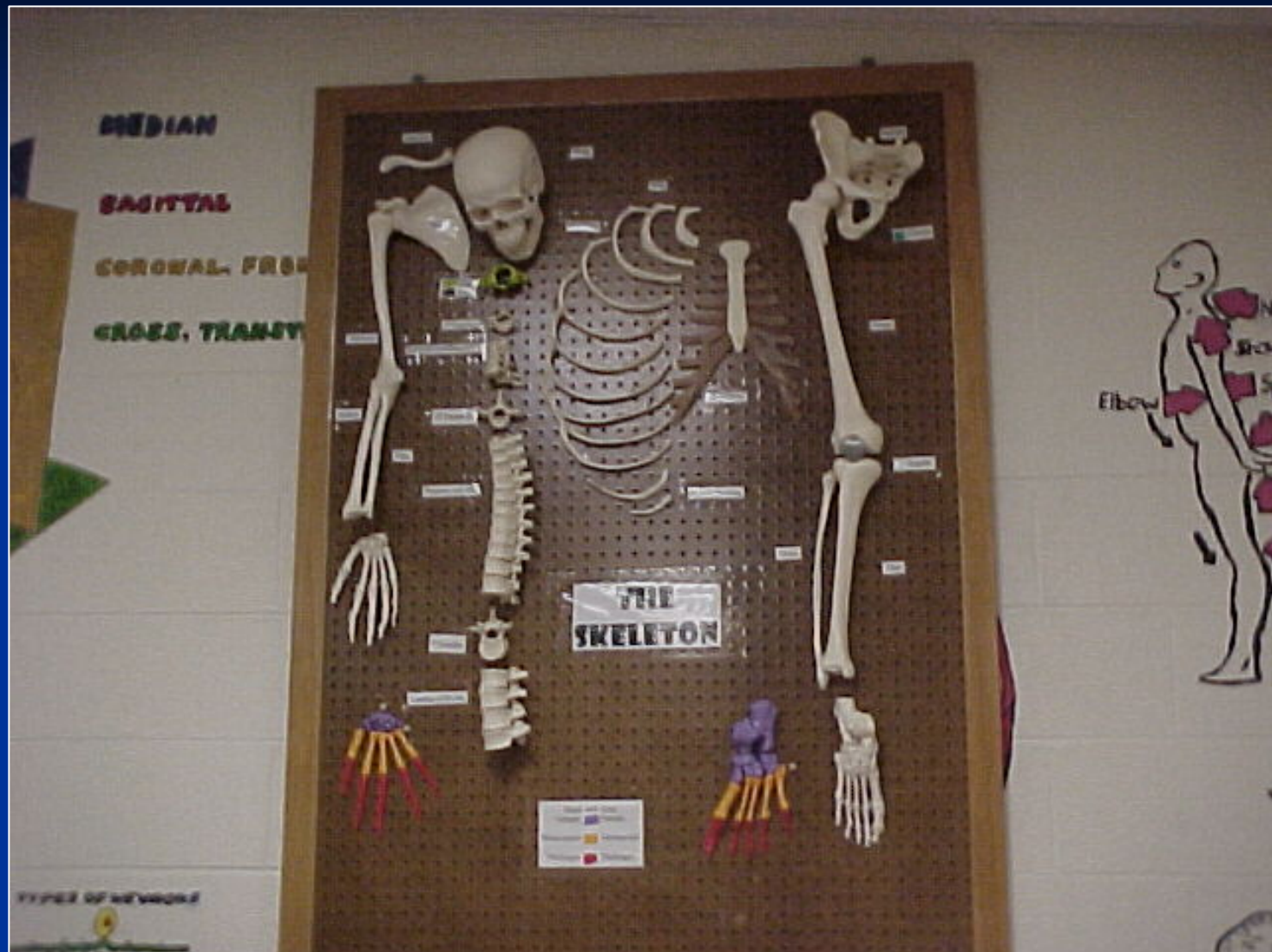
Short Mystery Solving

Profiling











Psychological

Profiling

[illegible]

- A full interview and full case is essential; psychologists will need to know:
 - A defendant's community can be assessed to show if they are able to meet day-to-day needs and legal obligations to their own health.
 - A defendant is assessed prior to being taken to be mentally unstable to ensure safety.
 - After they are taken to be assessed as to their state of mind in the case of the offence.
- * The only law of mental "insanity" and they can only offer the psychological treatment of a defendant, contribute an evidence to the criminal justice.



Stress-management "Stress is a physical, psychological, and behavioral response to a stimulus that is perceived as threatening or taxing the individual's resources." *—*James M. Brinkley, *Journal of Nursing Management*, 1998, 6, 101-106

Stressors "Stressors are the environmental factors that cause stress. They can be physical, psychological, or social. Examples of stressors include noise, crowding, time pressure, and role conflict." *—*James M. Brinkley, *Journal of Nursing Management*, 1998, 6, 101-106

Stress-management "Stress-management is the process of identifying and coping with stressors. It involves recognizing the signs and symptoms of stress, understanding the causes of stress, and developing strategies to manage stress." *—*James M. Brinkley, *Journal of Nursing Management*, 1998, 6, 101-106

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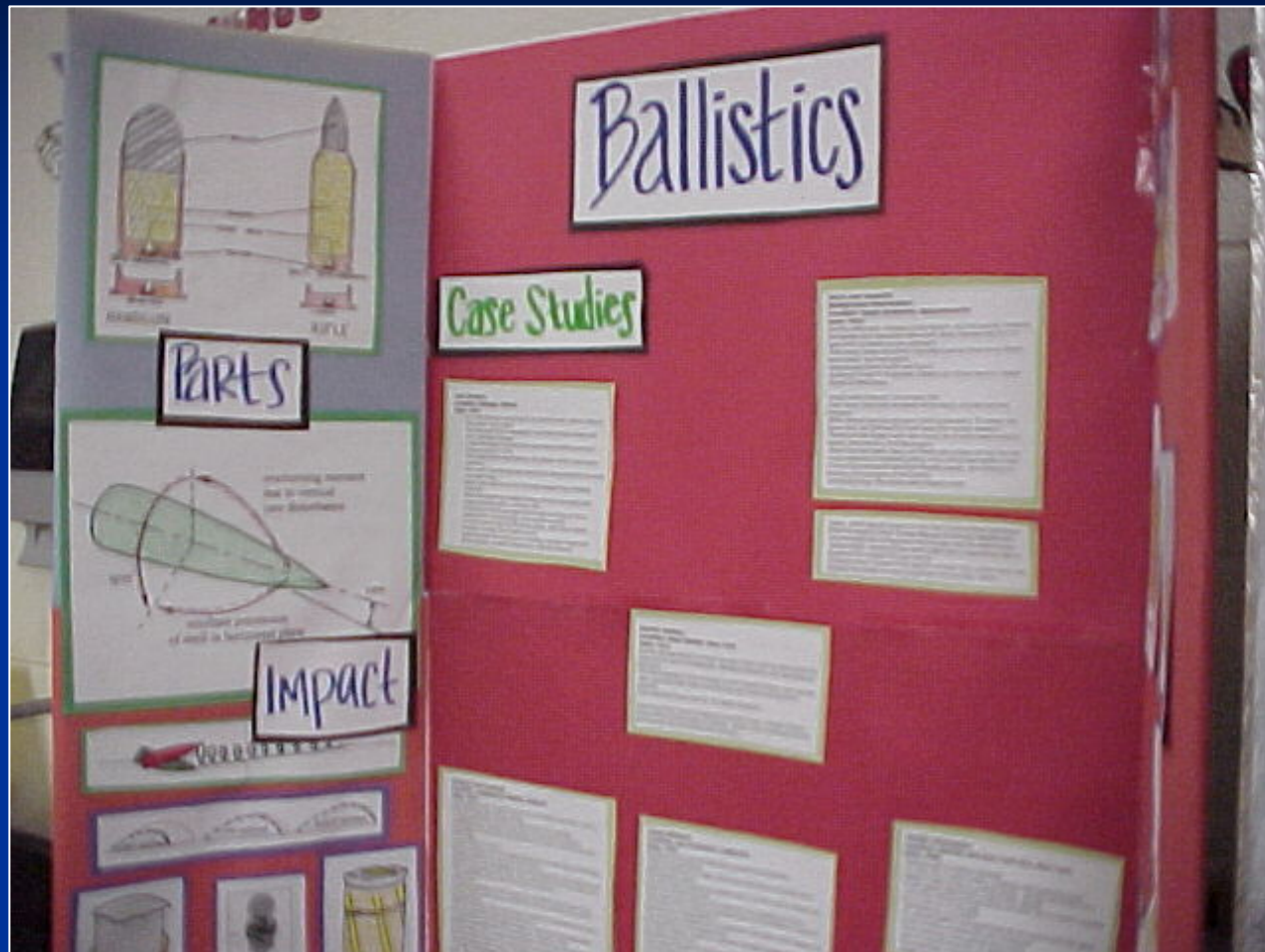
Case Study Review

How to Find Financial Change

1992

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

A photograph of a page from a book, showing dense, handwritten text in a cursive script. The page is framed by a red border, and a yellow tab is visible at the bottom left corner.



Forensic Toxicology

Toxicology is the science of harmful effects of substances on living organisms.

It deals with the harmful effects of the substances on living organisms. The substances include drugs, chemicals, poisons, etc. It also deals with the detection and identification of these substances in the body.

Forensic toxicology is a specialty area of analytical chemistry.

Substance	Effect
Alcohol	Intoxication, impaired judgment, loss of coordination
Drugs	Altered mental state, physical effects, addiction
Poisons	Organ damage, death
Chemicals	Burns, irritation, poisoning

Physical tests in testing poisons:
measuring pH, boiling point, refractive index.
Chemical tests: treatment with a chemical reagent to produce a color change.
Chemical spot tests: treatment with a chemical reagent to produce a color change.
Chromatography: thin-layer or gas-liquid chromatography used to separate components of a mixture.

Substance	Effect
Alcohol	Intoxication, impaired judgment, loss of coordination
Drugs	Altered mental state, physical effects, addiction
Poisons	Organ damage, death
Chemicals	Burns, irritation, poisoning

A toxicologist detects and identifies chemicals in the body. Toxicity is the study of the harmful effects of chemicals on living organisms.
A forensic toxicologist performs toxicology tests to identify the cause of death or poisoning.
A toxicologist investigates the effects of drugs on living organisms.
A forensic toxicologist performs toxicology tests to identify the cause of death or poisoning.
A toxicologist investigates the effects of drugs on living organisms.

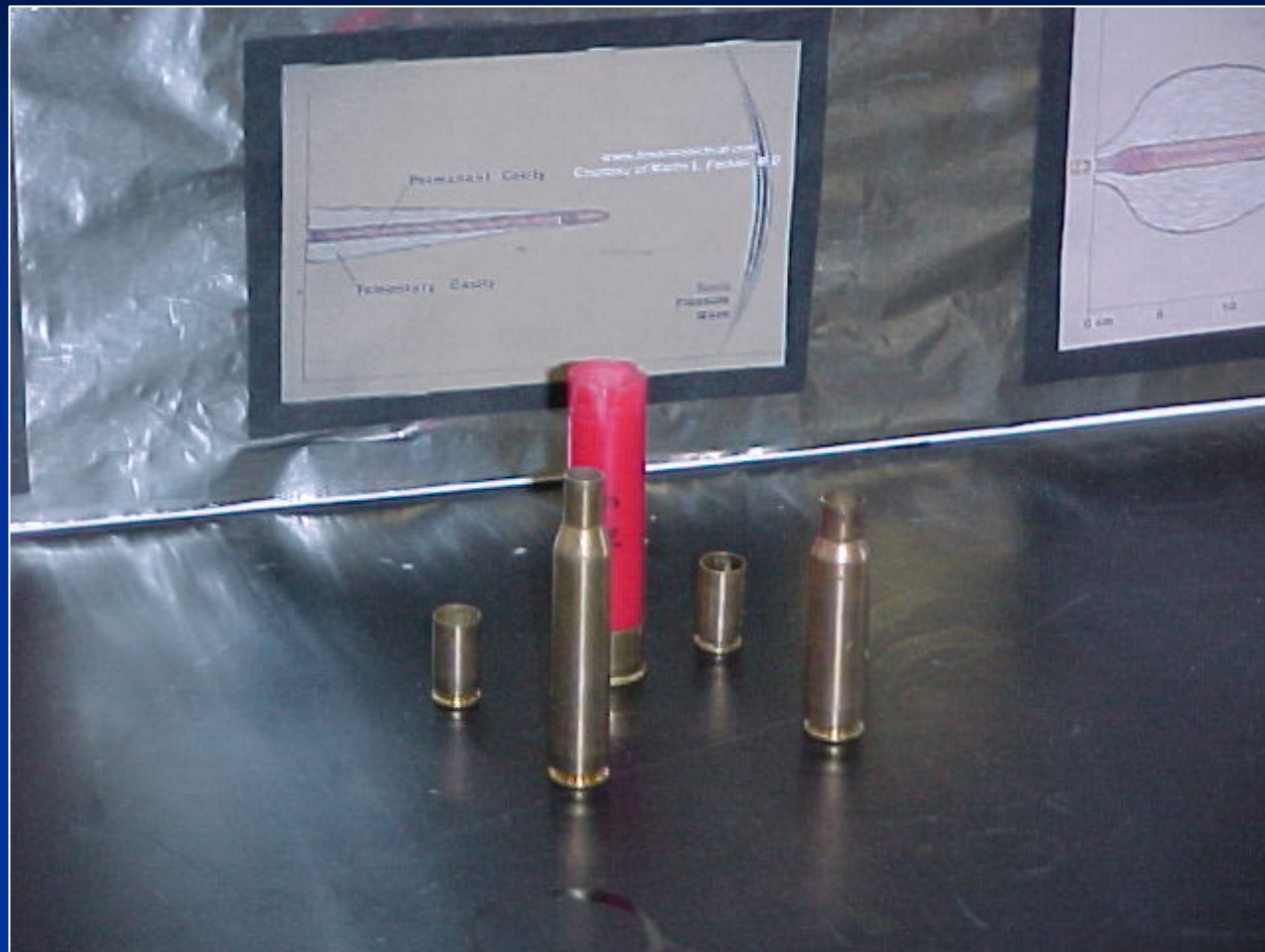
For certification as a toxicologist:
• A candidate must possess a Ph.D. in chemistry or a related field.
• There are about 120 poison control centers in the United States.
• There are about 120 poison control centers in the United States.
• There are about 120 poison control centers in the United States.

A forensic toxicologist is employed by a government agency or a private laboratory.
• They will have access to the laboratory's report which would contain information on various signs and symptoms, as well as laboratory results.
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A photograph of a science fair project display board. The board is covered in crinkled aluminum foil. At the top center, a white rectangular sign with a black border contains the word "BALLISTICS" in bold, black, serif capital letters. Below this, another white rectangular sign with a black border contains the text "THE STUDY OF PROJECTILE MOTION" in bold, black, serif capital letters, followed by "THE STUDY CONCERNED WITH DETERMINING WHETHER A BULLET OR CARTRIDGE WAS FIRED BY A PARTICULAR WEAPON" in smaller, black, serif capital letters. To the left of this central text is a photograph of a white, teardrop-shaped bullet. To the right is another photograph of a white, teardrop-shaped bullet. Below the central text is a large diagram of a handgun, showing its internal components and parts labeled with lines pointing to them. To the right of this diagram is another diagram of a handgun, showing its external profile. Below the handgun diagrams are two smaller diagrams, one showing a cross-section of a bullet and the other showing a cross-section of a cartridge. The board is also decorated with several white rectangular signs with black borders, some containing text and others containing images. On the left side, there is a sign with the word "HISTORY" and a sign with the word "DEFINITION". On the right side, there is a sign with the word "CONCLUSION". The board is set against a light-colored wall.

THE STUDY OF
PROJECTILE MOTION
THE STUDY CONCERNED
WHETHER A BULLET OR
CARTRIDGE WAS FIRED
BY A PARTICULAR
WEAPON

THE ANATOMY OF A HANDGUN



Observation Skill Skits



**“No one person
is smarter than the
team”**

Reading with a Purpose:

Harris Pic List

- Father of Forensics;
Colin Evans
ISBN # 0-425-210073
- The Casebook of
Forensic Detection;
Colin Evans
- Sherlock Holmes; Sir
Author Conan Doyle

